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THE ORIGIN AND GROWTH
OF
THE HEALING ART

*A POPULAR HISTORY OF MEDICINE
IN ALL AGES AND COUNTRIES.*

BY

EDWARD BERDOE,

*Licentiate of the Royal College of Physicians, Edinburgh; Member of the Royal College of
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Author of "The Browning Cyclopædia," etc., etc.*



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P R E F A C E.

THE History of Medicine is a *terra incognita* to the general reader, and an all but untravelled region to the great majority of medical men. On special occasions, such as First of October Addresses at the opening of the Medical Schools, or the Orations delivered before the various Medical Societies, certain periods of medical history are referred to, and a few of the great names of the founders of medical and surgical science are held up to the admiration of the audience. From time to time excellent monographs on the subject appear in the *Lancet* and *British Medical Journal*. But with the exception of these brilliant electric flashes, the History of Medicine is a dark continent to English students who have not made long and tedious researches in our great libraries. For it is a remarkable fact that the History of Medicine has been almost completely neglected by English writers. This cannot be due either to the want of importance or interest of the subject. Next to the history of religion ranks in interest and value that of medicine, and it would not be difficult to show that religion itself cannot be understood in its development and connections without reference to medicine. The priest and the physician are own brothers, and the Healing Art has always played an important part in the development of all the great civilisations. The modern science of Anthropology has placed at the disposal of the historian of medicine a great number of facts which throw light on the medical theories of primitive and savage man. But most of these have hitherto remained uncollected, and are not easily accessible to the general reader.

Although English writers have so strangely neglected this important field of research, the Germans have explored it in the most exhaustive manner. The great works of Sprengel, Haeser, Baas, and Puschmann, amongst many others of the same class, sustain the claim that Germany has created the History of Medicine, whilst the well-known but incom-

plete treatise of Le Clerc shows what a great French writer could do to make this *terra incognita* interesting.

Not that Englishmen have entirely neglected this branch of literature. Dr. Freind, beginning with Galen's period, wrote a *History of Physic to the Commencement of the Sixteenth Century*. Dr. Edward Meryon commenced a *History of Medicine*, of which Vol. I. only appeared (1861). In special departments Drs. Adams, Greenhill, Aikin, Munk, Wise, Royle, and others have made important contributions to the literature of the subject; but we have nothing to compare with the great German works whose authors we have mentioned above. The encyclopædic work of Dr. Baas has been translated into English by Dr. Handerson of Cleveland, Ohio.

Sprengel's work is translated into French, and Dr. Puschmann's admirable volume on Medical Education has been given in English by Mr. Evan Hare.

None of these important and interesting works, valuable as they are to the professional man, are quite suitable for the general reader, who, it seems to the present writer, is entitled in these latter days to be admitted within the inner courts of the temple of Medical History, and to be permitted to trace the progress of the mystery of the Healing Art from its origin with the medicine-man to its present abode in our Medical Schools.

With the exception of an occasional note or brief reference in his text-books of medicine and surgery, the student of medicine has little inducement to direct his attention to the work of the great pioneers of the science he is acquiring.

* One consequence of this defect in his education is manifested in the common habit of considering that all the best work of discoverers in the Healing Art has been done in our own times. "History of medicine!" exclaimed a hospital surgeon a few months since. "Why, there was none till forty years ago!" This habit of treating contemptuously the scientific and philosophical work of the past is due to imperfect acquaintance with, or absolute ignorance of, the splendid labours of the men of old time, and can only be remedied by devoting some little study to the records of travellers who have preceded us on the same path we are too apt to think we have constructed for ourselves. Professor Billroth declared, "that the great medical faculties should make it a point of honour to take care that lectures on the history of medicine are not missing in their curricula." And at several German

universities some steps in this direction have been taken. In England, however—so far as I am aware—nothing of the sort has been attempted, and a young man may attain the highest honours of his profession without the ghost of an idea about the long and painful process through which it has become possible for him to acquire his knowledge.

Says Dr. Nathan Davis,¹ “A more thorough study of the history of medicine, and in consequence, a greater familiarity with the successive steps or stages in the development of its several branches, would enable us to see more clearly the real relations and value of any new fact, induction, or remedial agent that might be proposed. It would also enable us to avoid a common error of regarding facts, propositions, and remedies presented under new names, as really new, when they had been well known and used long before, but in connection with other names or theories.” He adds that, “The only remedy for these popular and unjust errors is a frequent recurrence to the standard authors of the past generation, or in other words, an honest and thorough study of the history of medicine as a necessary branch of medical education.”

In these times, when no department of science is hidden from the uninitiated, especially when medical subjects and the works of medical men are freely discussed in our great reviews and daily journals, no apology seems necessary for withdrawing the professional veil and admitting the laity behind the scenes of professional work.

Medicine now has no mysteries to conceal from the true student of nature and the scientific inquirer. Her methods and her principles are open to all who care to know them; the only passport she requires is reverence, her only desire to satisfy the yearning to know. In this spirit and for these ends this work has been conceived and given to the world. “The proper study of mankind is man.”

EDWARD BERDOE.

TYNEMOUTH HOUSE,
VICTORIA PARK GATE,
LONDON, *April 22nd*, 1893.

¹ *Provincial Medical Journal*, March, 1892.

SPRENGEL GIVES THE FOLLOWING TABLE OF THE GREAT PERIODS IN
THE HISTORY OF MEDICINE :—

I. Expedition of the Argonauts.	1273-1263 B.C.	I. First traces of Greek Medicine.
II. Peloponnesian War.	432-404 B.C.	II. Medicine of Hippocrates.
III. Establishment of the Christian Religion.	30 A.D.	III. School of the Methodists.
IV. Emigration of the hordes of Barbarians.	430-530	IV. Decadence of the Science.
V. The Crusades.	1096-1230	V. Arabian medicine at its highest point of splendour.
VI. Reformation.	1517-1530	VI. Re-establishment of Greek medicine and anatomy.
VII. Thirty Years War.	1618-1648	VII. Discovery of the circulation of the blood and reform of Van Helmont.
VIII. Reign of Frederick the Great.	1640-1786	VIII. Haller.

Renouard¹ arranges the periods of the growth of the art of medicine as follows :—1st. The Primitive or Instinctive Period, lasting from the earliest recorded treatment to the fall of Troy. 2nd. The Sacred or Mystic Period, lasting till the dispersion of the Pythagorean Society, 500 B.C. 3rd. The Philosophical Period, closing with the foundation of the Alexandrian Library, B.C. 320. 4th. The Anatomical Period, which continued till the death of Galen, A.D. 200.

¹ *Histoire de Médecine depuis son Origine, etc.*

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BOOK I.

THE MEDICINE OF PRIMITIVE MAN.

A POPULAR HISTORY OF MEDICINE.

CHAPTER I.

PRIMITIVE MAN A SAVAGE.

The Medicine and Surgery of the Lower Animals.—Poisons and Animals.—Observation amongst Savages.—Man in the Glacial Period.

THERE is abundant proof from natural history that the lower animals submit to medical and surgical treatment, and subject themselves in their necessities to appropriate treatment. Not only do they treat themselves when injured or ill, but they assist each other. Dogs and cats use various natural medicines, chiefly emetics and purgatives, in the shape of grasses and other plants. The fibrous-rooted wheat-grass, *Triticum caninum*, sometimes called dog's-wheat, is eaten medicinally by dogs. Probably other species, such as *Agrostis canina*, brown bent-grass, are used in like manner.¹

Mr. George Jesse describes another kind of "dog-grass," *Cynosurus cristatus*, as a natural medicine, both emetic and purgative, which is resorted to by the canine species when suffering from indigestion and other disorders of the stomach. Every druggist's apprentice knows how remarkably fond cats are of valerian root (*Valeriana officinalis*). This strong-smelling root acts on these animals as an intoxicant, and they roll over and over the plant with the wildest delight when brought into contact with it. Cats are extravagantly fond of cat-mint (*Nepeta cataria*). It has a powerful odour, like that of pennyroyal. There is no evidence, however, that these plants have any medicinal properties for which they are used by cats, they are merely enjoyed by them on account of their perfume.

Dr. W. Lauder Lindsay, in his *Mind in the Lower Animals*, says that the Indian mongoose, poisoned by the snake which it attacks, uses the antidote to be found in the *Mimosa octandra*.²

"Its value both as a cure and as a preventive is said to be well known

¹ Pratt's *British Grasses*, pp. 69, 125.

² Vol. ii. p. 384.

to it. Whenever in its battles with serpents it receives a wound, it at once retreats, goes in search of the antidote, and having found and devoured it, returns to the charge, and generally carries the day, seeming none the worse for its bite."¹ This, however, is probably a fable of the Hindus.

"A toad, bit or stung by a spider, repeatedly betook itself to a plant of *Plantago major* (the Greater Plantain), and ate a portion of its leaf, but died after repeated bites of the spider, when the plant had been experimentally removed by man."²

The medicinal uses of the hellebore were anciently believed to have been discovered by the goat.

"Virgil reports of dittany," says More, in his *Antidote to Atheism*, "that the wild goats eat it when they are shot with darts." The ancients said that the art of bleeding was first taught by the hippopotamus, which thrusts itself against a sharp-pointed reed in the river banks, when it thinks it needs phlebotomy.

If man had not yet learned the medicinal properties of salt, he could discover them by the greedy licking of it by buffaloes, horses, and camels. "On the Mongolian camels," says Prejevalsky, "salt, in whatever form, acts as an aperient, especially if they have been long without it." Rats will submit to the gnawing off of a leg when caught in a trap, so that they may escape capture (Jesse). Livingstone says that the chimpanzee, soko, or other anthropoid apes will staunch bleeding wounds by means of their fingers, or of leaves, turf, or grass stuffed into them. Animals treat wounds by licking—a very effectual if tedious method of fomentation or poulticing.

Cornelius Agrippa, in his first book of Occult Philosophy, says that we have learned the use of many remedies from the animals. "The sick magpie puts a bay-leaf into her nest and is recovered. The lion, if he be feverish, is recovered by the eating of an ape. By eating the herb dittany, a wounded stag expels the dart out of its body. Cranes medicine themselves with bulrushes, leopards with wolf's-bane, boars with ivy; for between such plants and animals there is an occult friendship."³

Some interesting observations relating to the surgical treatment of wounds by birds were recently brought by M. Fatio before the Physical Society of Geneva. He quotes the case of the snipe, which he has often observed engaged in repairing damages. With its beak and feathers it makes a very creditable dressing, applying plasters to bleeding wounds, and even securing a broken limb by means of a stout ligature. On one occasion he killed a snipe which had on the chest a large dressing com-

¹ Miss Gordon Cumming.

² *Science Gossip*.

³ Morley's *Life of Cornelius Agrippa*, vol. i. p. 129.

posed of down taken from other parts of the body, and securely fixed to the wound by the coagulated blood. Twice he has brought home snipe with interwoven feathers strapped on to the site of fracture of one or other limb. The most interesting example was that of a snipe, both of whose legs he had unfortunately broken by a misdirected shot. He recovered the animal only the day following, and he then found that the poor bird had contrived to apply dressings and a sort of splint to both limbs. In carrying out this operation, some feathers had become entangled around the beak, and, not being able to use its claws to get rid of them, it was almost dead from hunger when discovered. In a case recorded by M. Magnin, a snipe, which was observed to fly away with a broken leg, was subsequently found to have forced the fragments into a parallel position, the upper fragment reaching to the knee, and secured them there by means of a strong band of feathers and moss intermingled. The observers were particularly struck by the application of a ligature of a kind of flat-leaved grass wound round the limb in a spiral form, and fixed by means of a sort of glue.

Le Clerc thought that the stories of animals teaching men the use of plants, herbs, etc., meant that men tried them first upon animals before using them for food or medicine. There is no probability of this having been so. If men had observed with Linnæus that horses eat aconite with impunity, and had in consequence eaten it themselves, the result would have been fatal. Birds and herbivorous animals eat belladonna with impunity,¹ and it has very little effect on horses and donkeys. Goats, sheep, and horses are said by Dr. Ringer to eat hemlock without ill effects, yet it poisoned Socrates. Henbane has little or no effect on sheep, cows, and pigs. Ipecacuanha does not cause vomiting in rabbits,² and so on.

Probably from the earliest times man would be led to observe the behaviour of animals when suffering from disease or injury. If he could not learn much from them in the way of medicine, they could teach him many useful arts. In savage man we must seek the beginnings of our civilization, and it is in the lowest tribes and those which have not yet felt the influences of superior races that we must search for the most primitive forms of medical ideas and the earliest theories and treatment of disease.

Sir John Lubbock says:³ "It is a common opinion that savages are, as a general rule, only the miserable remnants of nations once more civilized; but although there are some well-established cases of

¹ Ringer, *Materia Medica*, Fifth Edition, p. 454.

² Berdoe, *The Healing Art*, p. 18.

³ *Prehistoric Times*, Fifth Edition, p. 430.

natural decay, there is no scientific evidence which would justify us in asserting that this applies to savages in general."

Dr. E. B. Tylor, in his fascinating work on *Primitive Culture*, says:¹ "The thesis which I venture to sustain, within limits, is simply this—that the savage state in some measure represents an early condition of mankind, out of which the higher culture has gradually been developed or evolved by processes still in regular operation as of old, the result showing that, on the whole, progress has far prevailed over relapse. On this proposition the main tendency of human society during its long term of existence has been to pass from a savage to a civilized state. It is mere matter of chronicle that modern civilization is a development of mediæval civilization, which again is a development from civilization of the order represented in Greece, Assyria, or Egypt. Then the higher culture being clearly traced back to what may be called the middle culture, the question which remains is, whether this middle culture may be traced back to the lower culture, that is, to savagery."

Providing we can find our savage pure and uncontaminated, it matters little where we seek him; north, south, east, or west, he will be practically the same for our purpose.

Dr. Robertson says: "If we suppose two tribes, though placed in the most remote regions of the globe, to live in a climate nearly of the same temperature, to be in the same state of society, and to resemble each other in the degree of their improvement, they must feel the same wants, and exert the same endeavours to supply them. . . . In every part of the earth the progress of man has been nearly the same, and we can trace him in his career from the rude simplicity of savage life, until he attains the industry, the arts, and the elegance of polished society."²

Writing of the primitive folk, the Eastern Inoits, Elie Reclus tells us that,³ "shut away from the rest of the world by their barriers of ice, the Esquimaux, more than any other people, have remained outside foreign influences, outside the civilization whose contact shatters and transforms. They have been readily perceived by prehistoric science to offer an intermediate type between man as he is and man as he was in bygone ages. When first visited, they were in the very midst of the stone and bone epoch,⁴ just as were the Guanches when they were discovered; their iron and steel are recent, almost contemporary importations. The lives of Europeans of the Glacial period cannot have been very different from those led amongst their snow-fields by the Inoits of to-day."

¹ *Primitive Culture*, vol. i. p. 32.

² *Primitive Folk*, p. 10.

³ *Hist. America*, Book IV. chap. ii.

⁴ Nordenskiöld, *Voyage of the Vega*.

CHAPTER II.

ANIMISM.

Who discovered our Medicines?—Anthropology can assist us to answer the Question.

—The Priest and the Medicine-man originally one.—Disease the Work of Magic.

—Origin of our Ideas of the Soul and Future Life.—Disease-lemons.

CARDINAL NEWMAN, in his sermon on "The World's Benefactors," asks "Who was the first cultivator of corn? Who first tamed and domesticated the animals whose strength we use, and whom we make our food? Or who first discovered the medicinal herbs, which from the earliest times have been our resource against disease? If it was mortal man who thus looked through the vegetable and animal worlds, and discriminated between the useful and the worthless, his name is unknown to the millions whom he has thus benefited.

"It is notorious that those who first suggest the most happy inventions and open a way to the secret stores of nature; those who weary themselves in the search after truth; strike out momentous principles of action; painfully force upon their contemporaries the adoption of beneficial measures; or, again, are the original cause of the chief events in national history,—are commonly supplanted, as regards celebrity and reward, by inferior men. Their works are not called after them, nor the arts and systems which they have given the world. Their schools are usurped by strangers, and their maxims of wisdom circulate among the children of their people, forming perhaps a nation's character, but not embalming in their own immortality the names of their original authors."

The reflection is an old one; the son of Sirach said, "And some there be, which have no memorial; who are perished, as though they had never been; and are become as though they had never been born; and their children after them. But these were merciful men, whose righteousness hath not been forgotten" (*Ecclesiasticus* xliv. 9, 10). Cardinal Newman has framed his question, so far as the healing art is concerned, in a manner to which it is impossible to make a satisfactory answer. No one man first discovered the medicinal herbs; probably the discovery of all the virtues of a single one of them was not the work of any individual. No man "looked through the vegetable and animal worlds

and discriminated between the useful and the worthless"; all this has been the work of ages, and is the outcome of the experience of thousands of investigators. The medical arts have played so important a part in the development of our civilization, that they constitute a branch of study second to none in utility and interest to those who would know something of the work of the world's benefactors. Probably at no period in the world's history have medical men occupied a more honourable or a more prominent position than they do at the present time, and it would almost seem that the rewards which an ignorant or ungrateful civilization denied in the past to medical men are now being bestowed on those who in these latter days have been so fortunate as to inherit the traditions and the acquirements of a forgotten ancestry of truth-seekers and students of the mysteries of nature. As the earliest races of mankind passed by slow degrees from a state of savagery to the primitive civilizations, we must seek for the beginnings of the medical arts in the representatives of the ancient barbarisms which are to be found to-day in the aborigines of Central Africa and the islands of Australasian seas. The intimate connection which exists between the magician, the sorcerer, and the "medicine man" of the present day serves to illustrate how the priest, the magician, and the physician of the past were so frequently combined in a single individual, and to explain how the mysteries of religion were so generally connected with those of medicine.

Professor Tylor has explained how death and all forms of disease were attributed to magic, the essence of which is the belief in the influence of the spirits of dead men. This belief is termed Animism, and Mr. Tylor says: "Animism characterizes tribes very low in the scale of humanity, and thence ascends, deeply modified in its transmission, but from first to last preserving an unbroken continuity, into the midst of high culture. Animism is the groundwork of the philosophy of religion, from that of the savages up to that of civilized men; but although it may at first seem to afford but a meagre and bare definition of a minimum of religion, it will be found practically sufficient; for where the roots are, the branches will generally be produced. The theory of animism divides into two great dogmas, forming parts of one consistent doctrine: first, concerning souls of individual creatures, capable of continued existence after death; second, concerning other spirits, upward to the rank of powerful deities. Spiritual beings are held to affect or control the events of the material world, and man's life here and hereafter; and it being considered that they hold intercourse with men and receive pleasure or displeasure from human actions, the belief in their existence leads naturally, sooner or later, to active reverence and propitiation." There is no doubt that the belief in the

soul and in the existence of the spirits of the departed in another world arose from dreams. When the savage in his sleep held converse, as it seemed to him, with the actual forms of his departed relatives and friends, the most natural thing imaginable would be the belief that these persons actually existed in a spiritual shape in some other world than the material one in which he existed. Those who dreamed most frequently and most vividly, and were able to describe their visions most clearly, would naturally strive to interpret their meaning, and would become, to their grosser and less poetical brethren, more important personages, and be considered as in closer converse with the spiritual world than themselves. Thus, in process of time, the seer, the prophet, and the magician would be evolved.

How did primitive man come by his ideas? When he saw the effects of a power, he could only make guesses at the cause; he could only speak of it by some such terms as he would use concerning a human agent. He saw the effects of fire, and personified the cause. With the Hindus Agni was the giver of light and warmth, and so of the life of plants, of animals, and of men; and so with thunder, lightning, and storm, primitive man looked upon these phenomena as the conflicts of beings higher and more powerful than himself. Thus it was that the ancient people of India formed their conceptions of the storm-gods, the Maruts, *i.e.* the Smashers. Amongst the Esthonians, as Max Müller tells us,¹ prayers were addressed to thunder and rain as late as the seventeenth century. "Dear Thunder, push elsewhere all the thick black clouds. Holy Thunder, guard our seed-field." (This same thunder-god, *Perkuna*, says Max Müller, was the god *Parganya*, who was invoked in India a thousand years before Alexander's expedition.) We say *it* rains, *it* thunders. Primitive folk said the rain-god poured out his buckets, the thunder-god was angry.

What did primitive man think when he observed the germination of seeds; the chick coming out of the egg; the butterfly bursting from the chrysalis; the shadow which everywhere accompanies the man; the shadows of the trees; the leaves which vibrate in the breeze; when he heard the roaring of the wind; the moaning of the storm, and the strange, mysterious echo which, plainly as he heard it, ceased as he approached the mountain-side which he conceived to be its home? He could but believe that all nature was living, like himself; and that, as he could not understand what he saw in the seed, the egg, the chrysalis, or the shadow, so all nature was full of mystery, of a life that he in vain would try to comprehend. Many savages regard their own shadows as one of their two souls,—a soul which is always watching

¹ *India's Teaching*, p. 192.

their actions, and ready to bear witness against them. How should it be otherwise with them? The shadow is a reality to the savage, and so is the echo. The ship which visits his shores, the watch and the compass, which he sees for the first time, are alive; they move, they must be living!

Mr. Tylor, in his chapter on Animism, in his *Primitive Culture*, says (vol. ii. pp. 124, 125):—

“As in normal conditions the man’s soul, inhabiting his body, is held to give it life, to think, speak, and act through it, so an adaptation of the self-same principle explains abnormal conditions of body or mind, by considering the new symptoms as due to the operation of a second soul-like being, a strange spirit. The possessed man, tossed and shaken in fever, pained and wrenched as though some live creature were tearing or twisting him within, pining as though it were devouring his vitals day by day, rationally finds a personal spiritual cause for his sufferings. In hideous dreams he may even sometimes see the very ghost or nightmare-fiend that plagues him. Especially when the mysterious, unseen power throws him helpless to the ground, jerks and writhes him in convulsions, makes him leap upon the bystanders with a giant’s strength and a wild beast’s ferocity, impels him, with distorted face and frantic gesture, and voice not his own, nor seemingly even human, to pour forth wild incoherent raving, or with thought and eloquence beyond his sober faculties, to command, to counsel, to foretell—such a one seems to those who watch him, and even to himself, to have become the mere instrument of a spirit which has seized him or entered into him—a possessing demon in whose personality the patient believes so implicitly that he often imagines a personal name for it, which it can declare when it speaks in its own voice and character through his organs of speech; at last, quitting the medium’s spent and jaded body, the intruding spirit departs as it came. This is the savage theory of demoniacal possession and obsession, which has been for ages, and still remains, the dominant theory of disease and inspiration among the lower races. It is obviously based on an animistic interpretation, most genuine and rational in its proper place in man’s intellectual history, of the natural symptoms of the cases. The general doctrine of disease-spirits and oracle-spirits appears to have its earliest, broadest, and most consistent position within the limits of savagery. When we have gained a clear idea of it in this its original home, we shall be able to trace it along from grade to grade of civilization, breaking away piecemeal under the influence of new medical theories, yet sometimes expanding in revival, and, at least, in lingering survival holding its place into the midst of our modern life. The possession-theory is not merely

known to us by the statements of those who describe diseases in accordance with it. Disease being accounted for by attacks of spirits, it naturally follows that to get rid of these spirits is the proper means of cure. Thus the practices of the exorcist appear side by side with the doctrine of possession, from its first appearance in savagery to its survival in modern civilization; and nothing could display more vividly the conception of a disease or a mental affliction as caused by a personal spiritual being than the proceedings of the exorcist who talks to it, coaxes or threatens it, makes offerings to it, entices or drives it out of the patient's body, and induces it to take up its abode in some other."

CHAPTER III.

SAVAGE THEORIES OF DISEASE.

Demoniacal.—Witchcraft.—Offended Dead Persons.

WE find amongst savages three chief theories of disease ; that it is caused by—

- I. The anger of an offended demon.
- II. Witchcraft, or
- III. Offended dead persons.

I. ANGER OF OFFENDED DEMONS.

Disease and death are set down to the influences of spirits in the Australian-Tasmanian district, where demons are held to have the power of creeping into men's bodies, to eat up their livers, and sometimes to work the wicked will of a sorcerer by inflicting blows with a club on the back of the victim's neck.¹ The Mantira, a low race of the Malay Peninsula, believe in the theory of disease-spirits in its extreme form ; their spirits cause all sorts of ailments. The "Hantu Kalumbahan" causes small-pox ; the "Hantu Kamang" brings on inflammation and swelling of the hands and feet ; the blood which flows from wounds is due to the "Hantu-pari," which fastens on the wound and sucks. So many diseases, so many Hantus. If a new malady were to appear amongst the tribes, a new Hantu would be named as its cause.² When small-pox breaks out amongst these people, they place thorns and brush in the paths to keep the demons away. The Khonds of Orissa try to defend themselves against the goddess of small-pox, Jugah Pensu, in the same way. Among the Dayaks of Borneo, to have been ill is to have been smitten by a spirit ; invisible spirits inflict invisible wounds with invisible spears, or they enter bodies and make them mad. Disease-spirits in the Indian Archipelago are conciliated by presents

¹ *Tr. Eth. Soc.*, vol. iii. p. 235. Grey, *Australia*, vol. ii. p. 337. Boniveh, *Tasmanians*, pp. 183, 195.

² *Journ. Ind. Archip.*, vol. i. p. 307.

and dances. In Polynesia, every sickness is set down to deities which have been offended, or which have been urged to afflict the sufferer by their enemies.¹ In New Zealand disease is supposed to be due to a baby, or undeveloped spirit, which is gnawing the patient's body. Those who endeavour to charm it away persuade it to get upon a flax-stalk and go home. Each part of the body is the particular region of the spirit whose office it is to afflict it.²

The Prairie Indians treat all diseases in the same way, as they must all have been caused by one evil spirit.³

Among the Betschvaria disease may be averted if a painted stone or a crossbar smeared with medicine be set up near the entrance of the residence or approach to a town.⁴

Amongst the Bodo and Dhimal peoples, when the exorcist is called to a sick man he sets thirteen loaves round him, to represent the gods, one of whom he must have offended; then he prays to the deity, holding a pendulum by a string. The offended god is supposed to cause the pendulum to swing towards his loaf.⁵

The New Zealanders had a separate demon for each part of the body to cause disease. Tonga caused headache and sickness; Moko-Tiki was responsible for chest pains, and so on.⁶

The Karens of Burmah and the Zulus both say, "The rainbow is disease. If it rests on a man, something will happen to him."⁷ "The rainbow has come to drink wells." They say, "Look out; some one or other will come violently by an evil death."

The Tasmanians lay their sick round a corpse on the funeral pile, that the dead may come in the night and take out the devils that cause the diseases.⁸

The Zulus believe that spirits, when angry, seize a living man's body and inflict disease and death, and when kindly disposed give health and cattle. In Madagascar, Mr. Tylor tells us, the spirits of the Vazimbias, the aborigines of the island, inflict diseases, and the Malagasy accounts for all sorts of mysterious complaints by the supposition that he has given offence to some Vazimba. The Gold Coast negroes believe that ghosts plague the living and cause sickness. The Dayaks of Borneo think that the souls of men enter the trunks of trees, and the Hindus hold that plants are sometimes the homes of the spirits of the departed. The Santals of Bengal believe that the spirits of the good

¹ *Journ. Ind. Archip.*, vol. iii. p. 110, vol. iv. p. 194.

² Taylor, *New Zealand*, pp. 48, 137.

³ *Folk Medicine*, p. 3.

⁴ *Ibid.*, p. 7.

⁵ Hodgson, *Abor. of India*, p. 170; cited in *Folk Med.*, p. 10.

⁶ *Folk Med.*, p. 11.

⁷ *Ibid.*, p. 11.

⁸ Tylor, *Primitive Culture*, vol. ii. p. 114.

enter into fruit-bearing trees.¹ It is but another step to the belief that beneficent medicinal plants are tenanted by good spirits, and poisonous plants by evil spirits. The Malays have a special demon for each kind of disease ; one for small-pox, another for swellings, and so on.²

The Dayaks of Borneo acknowledge a supreme God, although, as we have said, they attribute all kinds of diseases and calamities to the malignity of evil spirits. Their system of medicine consists in the application of appropriate charms or the offering of conciliatory sacrifices.³ Yet they are an intelligent and highly capable race, and their steel instruments far surpass European wares in strength and fineness of edge.⁴

The Javanese, nominally Mahometans, are really believers in the primitive animism of their ancestry. They worship numberless spirits ; all their villages have patron saints, to whom is attributed all that happens to the inhabitants, good or bad. Mentik causes the rice disease ; Sawan produces convulsions in children ; Dengen causes gout and rheumatism.⁵

The religion of Siam is a corrupted Buddhism ; spirits and demons (nats or phees) are worshipped and propitiated. Some of these malignant beings cause children to sicken and die. Talismans are worked into the ornamentation of the houses to avert their evil influence.⁶

The Rev. J. L. Wilson⁷ says : "Demoniacal possessions are common, and the feats performed by those who are supposed to be under such influence are certainly not unlike those described in the New Testament. Frantic gestures, convulsions, foaming at the mouth, feats of supernatural strength, furious ravings, bodily lacerations, grinding of teeth, and other things of a similar character, may be witnessed in most of the cases."

In Finnish mythology, which introduces us to ideas of extreme antiquity, we find the disease-demon theory in all its force.

The *Tietajat*, "the learned," and the *Noijat*, or sorcerers, claimed the power to cure diseases by expelling the demons which caused them, by incantations assisted by drugs ; these magicians were the only physicians of the nation. The *Tietajat* and the *Noijat*, however, were not magicians of the same class : the former practised "white magic," or "sacred science" ; the latter practised "black magic," or sorcery. Evil spirits, poisons, and malice were the chief aids to practice in the latter ; while *Tietajat*, by means of learning and the assistance of benevolent supernatural beings, devote themselves to the welfare of the people. The three highest deities of Finnish mythology, Ukko, Wäinä-

¹ Hunter, *Rural Bengal*, p. 210.

² Dr. E. B. Tylor, art. "Demonology," *Ency. Brit.*

³ *Ency. Brit.*, vol. iv. p. 58.

⁴ *Ibid.*

⁵ *Ibid.*, vol. xiii. p. 607.

⁶ *Ibid.*, vol. xxi. p. 853.

⁷ *Western Africa*, p. 217.

möinen, and Ilmarinen, corresponded to three superior gods of the Accadian magic collection, Ana, Hea, and Mut-ge. Wäinämöinen was the great spirit of life, the master of favourable spells, conqueror of evil, and sovereign possessor of science. The sweat which dropped from his body was a balm for all diseases. It was he alone who could conquer all the demons. Every disease was itself a demon. The invasion of the disorder was an actual possession. Finnish magic was chiefly medical, being used to cure diseases and wounds.¹ The Finns believed diseases to be the daughters of Louhiatar, the demon of diseases. Pleurisy, gout, colic, consumption, leprosy, and the plague were all distinct personages. By the help of conjurations, these might be buried or cooked in a brazen vessel. When the priest made his diagnosis he had to be in a state of divine ecstasy, and then by incantation, assisted by drugs, he proceeded to exorcise the demon. The Finnish incantations belonged to the same family as those of the Accadians. Professor Lenormant translates from the great Epopee of the *Kalevala* one of the incantations :—

“O malady, disappear into the heavens ; pain, rise up to the clouds ; inflamed vapour, fly into the air, in order that the wind may take thee away, that the tempest may chase thee to distant regions, where neither sun nor moon give their light, where the warm wind does not inflame the flesh.

“O pain, mount upon the winged steed of stone, and fly to the mountains covered with iron. For he is too robust to be devoured by disease, to be consumed by pains.

“Go, O diseases, to where the virgin of pains has her hearth, where the daughter of Wäinämöinen cooks pains,—go to the hill of pains.

“These are the white dogs, who formerly hurled torments, who groaned in their sufferings.”

Another incantation against the plague was discovered by Ganander, and is given by Lenormant :—

“O scourge, depart ; plague, take thy flight, far from the bare flesh.

“I will give thee a horse, with which to escape, whose shoes shall not slide on ice ;” and so on.

The Jewish ceremony expelled the scapegoat to the desert ; the Accadian banished the disease-demons to the desert of sand ; the Finnish magician sent his disease-demons to Lapland.

The goddess Suonetar was the healer and renewer of flesh :—

“She is beautiful, the goddess of veins, Suonetar, the beneficent-goddess ! She knits the veins wonderfully with her beautiful spindle, her metal distaff, her iron wheel.

¹ Lenormant, *Chaldean Magic and Sorcery*, pp. 258-262.

"Come to me, I invoke thy help; come to me, I call thee. Bring in thy bosom a bundle of flesh, a ball of veins to tie the extremity of the veins."¹

"All diseases are attributed by the Thibetans to the four elements, who are propitiated accordingly in cases of severe illness. The winds are invoked in cases of affections of the breathing; fire in fevers and inflammations; water in dropsy, and diseases whereby the fluids are affected; and the god of earth when solid organs are diseased, as in liver complaints, rheumatism, etc. Propitiatory offerings are made to the deities of these elements, but never sacrifices."²

Hooker tells of a case of apoplexy which was treated by a Lama, who perched a saddle on a stone, and burning incense before it, scattered rice to the winds, invoking the various mountain peaks in the neighbourhood.

In Hottentot mythology Gaunab is a malevolent ghost, who kills people who die what we call a "natural" death. Unburied men change into this sort of vampire.³

The demoniacal theory of at least one class of disease is found in the Bible, although the New Testament in one passage distinguishes between lunatics and demoniacs. In Matthew iv. 24 we read that they brought to Jesus "those which were possessed with devils, and those which were lunatick." Epilepsy is evidently the disease described in Mark ix. 17-26, though the symptoms are attributed to possession by a dumb spirit.

II. WITCHCRAFT AS A CAUSE OF DISEASE.

Sorcerers and magicians not only use evil words and cast evil glances at the persons whom they wish to afflict, but they endeavour to obtain possession of some article which has belonged to the individual, or something connected more closely with his personality, as parings of the nails or a few of his hairs, and through these he professes to be able to operate more effectually on the object of his malice. It is to this use of portions of the body that ignorant persons, even at the present day, insist that nail-parings, hair-cuttings, and the like, shall be at once destroyed by fire. Such superstitions are found at work all over the world. Mr. Black tells us⁴ that the servants of the chiefs of the

¹ *Kalevala*, 15th runa.

² Sir Joseph Hooker, *Himalayan Journals*, Ed. 1891, p. 416.

³ Lang, *Custom and Myth*, p. 208.

⁴ *Folk Medicine*, pp. 17, 18.

South Sea Islanders carefully collect and bury their masters' spittle in places where sorcerers are not likely to find it. He says also it is believed in the West of Scotland that if a bird used any of the hair of a person's head in building his nest, the individual would be subject to headaches and become bald. Of course the bird is held to be the embodiment of an evil spirit or witch. Images of persons to be bewitched are sometimes made in wood or wax, in which has been inserted some of the hair of the victim of the enchantment; the image is then buried, and before long some malady attacks the part of the bewitched person corresponding to that in which the hair has been placed in his effigy. Disease-making is a profession in the island of Tanna in the New Hebrides; the sorcerers collect the skins and shells of the fruits eaten by any one who is to be punished, they are then slowly burned, and the victims sicken. Disease-demons are driven away from patients in Alaska by the beating of drums. The size of the drum and the force of the beating are directly proportioned to the gravity of the disease. A headache can be dispelled by the gentle tapping of a toy drum; concussion of the brain would require that the big drum should be thumped till it broke; if that failed to expel the evil spirit, there would be nothing left but to strangle the patient.

The wild natives of Australia are exceedingly superstitious. Sorcery enters into every relation of life, and their great fear is lest they should be injured by the mysterious influence called *boyl-ya*. The sorcerers have power to enter the bodies of men and slowly consume them; the victim feels the pain as the *boyl-ya* enters him, and it does not leave him till it is extracted by another sorcerer. While he is sleeping, he may be attacked and bewitched by having pointed at him a leg-bone of a kangaroo, or the sorcerer may steal away his kidney-fat, where the savage believes that his power resides, or he may secretly slay his victim by a blow on the back of his neck. The magician may dispose of his victim by procuring a lock of his hair and roasting it with fat; as it is consumed, so does his victim pine away and die.

Wingo is a superstition which some Australian tribes have, that with a rope of fibre they can partially choke a man, by putting it round his neck at night while he is asleep, without waking him; his enemy then removes his caul-fat from under his short rib, leaving no mark or wound. When the victim awakes he feels no pain or weakness, but sooner or later he feels something break in his inside like a string. He then goes home and dies at once.¹

Dr. Watson thus describes the typical medicine-men:—

“The Tla-guill-augh, or man of supernatural gifts, is supposed to be

¹ E. Palmer, *Notes on Australian Tribes*.

capable of throwing his good or bad medicine, without regard to distance, on whom he will, and to kill or cure by magic at his pleasure. These medicine-men are generally beyond the meridian of life; grave, sedate, and shy, with a certain air of cunning, but possessing some skill in the use of herbs and roots, and in the management of injuries and external diseases. The people at large stand in great awe of them, and consult them on every affair of importance."¹

Dr. O. L. Möller, Medical Director-General of the Danish army, describes a certain wise woman near Lögstör, who used in her prescriptions for the sick people who consulted her a charm of willow twigs tied together amongst other mystic things, and whose therapeutics were of a bloodthirsty character, as she would advise her patients to strike the first person they met after returning home, until they drew blood, for that person would be the cause of the disease.²

The fact that ghosts and demons are everywhere believed to cause diseases, and that sorcery is practised more or less by most of the races of man in connection with the causation or cure of disease, has been used as a factor in the argument for the origin of primitive man from a single pair in accordance with the orthodox belief. Dr. Pickering, the ethnologist, says: "Superstitions also appear to be subject to the same laws of progression with communicated knowledge, and the belief in ghosts, evil spirits, and sorcery, current among the ruder East Indian tribes, in Madagascar, and in a great part of Africa, seems to indicate that such ideas may have elsewhere preceded a regular form of mythology."³

There has long been practised in the West Indies a species of witchcraft called *Obeah* or *Obi*, supposed to have been introduced from Africa, and which is in reality an ingenious system of poisoning. Mr. Bowrey, Government chemist in Jamaica, connects Obeah-poisoning with a plant which grows abundantly in Jamaica and other West Indian islands, called the "savannah flower," or "yellow-flowered nightshade" (*Urechites suberecta*).⁴

Mr. Bowrey concludes that there is some truth in the stories told of the poisoning by Obeah-men, and that minute doses, frequently administered, might cause death without suspicion being aroused. The *British Medical Journal*, June 18th, 1892, has the following interesting notes on Obeah (p. 1296):—

"It is difficult to obtain detailed information regarding Obeah prac-

¹ *The Medical Profession in Ancient Times* (New York, 1856).

² *Denmark, its Hygiene and Demography*, 1891, p. 57.

³ *The Races of Man*, p. 292.

⁴ *Proc. Roy. Soc.*, xxvii. 309, 1878.

tices. They rest largely on the credence given to superstitious practices and vulgar quackery by the uneducated in every country, but there seems little doubt that among them secret poisoning is included. Benjamin Moseley (*Medical Tracts*, London, 1800) states that Obi had its origin, like many customs among the Africans, from the ancient Egyptians, *Ob* meaning a demon or magic. Villiers-Stuart (*Jamaica Revisited*, 1891) says that Obeah in the West African dialects signifies serpent, and that the Obeah-men in Jamaica carry (but in greatest secrecy, for fear of the penal laws) a stick on which is carved a serpent, the emblem being a relic of the serpent worship once universal among mankind, and also that they sacrifice cocks at their religious rites. Moseley gives the following account: 'Obi, for the purposes of bewitching people or consuming them by lingering illness, is made of grave-dirt, hair, teeth of sharks and other animals, blood, feathers,' and so on. Mixtures of these are placed in various ways near the person to be bewitched. 'The victims to this nefarious art in the West Indies among the negroes are numerous. No humanity of the master nor skill in medicine can relieve the poor negro labouring under the influence of Obi. He will surely die, and of a disease that answers no description in nosology. This, when I first went to the colonies, perplexed me. Laws have been made in the West Indies to punish the Obian practice with death, but they have been impotent and nugatory. Laws constructed in the West Indies can never suppress the effect of ideas, the origin of which is in the centre of Africa.' 'A negro Obi-man will administer a baleful dose from poisonous herbs, and calculate its mortal effects to an hour, day, week, month, or year.' The missionaries Waddell (*Twenty-nine Years in the West Indies and Central Africa*, 1863) and Blyth (*Reminiscences of Missionary Life*, 1851) confirm this account. They are all agreed that similar practices prevail in West and Central Africa, and that Jamaican Obeah-men use poisons. Mr. Bowrey informs me that he has examined many Obeah charms, and confirms Moseley's account of them. He thinks, however, that among the negroes the knowledge of poisons has been rapidly dying out, 'doctor's medicine' and the much-advertised patent medicines having largely replaced the drugs of the native practitioners. The belief in Obeah is still, however, almost universal among the black population. According to Sir Spencer St. John (*Hayti, or the Black Republic*, second edition, London, 1889) secret poisoning is a lucrative occupation in the neighbouring island of Hayti, certain of the people having an intimate knowledge of indigenous poisonous plants and being expert poisoners."

III. OFFENCE TO THE DEAD AS A CAUSE OF DISEASE.

How comes it that all the races of man of which we have any accurate information have some belief or other in spirits good or bad, and of some other life than the actual one which they live in their waking hours? The theologian answers it in his own way, the anthropologist in his, and perhaps a simpler one. With the religious aspect of the question we are not here concerned, we have merely to consider the scientific points involved. When the most ignorant savage of the lowest type falls asleep, he is as sure to dream as his more favoured civilized brother. To his companions he appears as though he were dead, he is motionless and apparently unconscious. He awakes and is himself again. What has his spirit or thinking part been doing while his body slept? The man has seen various things and places, has even conversed with friend or foe in his slumbers, has engaged in fights, has taken a journey, has had adventures, and yet his body has not stirred. Naturally enough the explanation most satisfactory is, that his soul has temporarily left his body, and has met other souls in a similar condition. He has seen and conversed with his dead friends or relatives, has been comforted by their presence or alarmed at the visitation. Here, then, we have the anthropologist's "theory of souls where life, mind, breath, shadow, reflexion, dream, vision, come together and account for one another in some such vague, confused way as satisfies the untaught reasoner." ¹

But the savage goes further than this : he has seen his horse, his dog, his canoe, and his spear in his dream, they too must have souls ; and thus he invests with a spiritual essence every material object by which he is surrounded. And so we find funeral sacrifices and ceremonies all over the world which testify to this universal belief of primitive man. The ornaments and weapons which are found with the bones of chiefs, the warrior's horses slain at his burial place, the food and drink and piece of money left with the dead, are intelligible on this theory, and on no other. The savage's idea of a demon or evil spirit is usually that of a soul of a malevolent dead man. The man was his enemy during life, he remains his enemy after death ; or he owed some acknowledgment and reward to a spirit who had helped him, he has neglected to pay his debt, and he has offended the spirit in consequence. In cases of fainting, delirium from fever, hysteria, epilepsy, or insanity, the savage sees the partial absence of the patient's soul from his body, or the work of a tormenting demon. Demoniacal possession and the ceremonies of exorcism are theories readily explainable by facts with which the an-

¹ Tylor's *Anthropology*, p. 344.

thropologist is familiar. "The sick Australian will believe that the angry ghost of a dead man has got into him, and is gnawing his liver; in a Patagonian skin hut the wizards may be seen dancing, shouting, and drumming, to drive out the evil demon from a man down with fever."¹

When Prof. Bartram, the anthropologist, was in Burma, his servant was seized with an apopleptic fit. The man's wife, of course, attributed the misfortune to an angry demon, so she set out for him little heaps of rice, and was heard praying, "Oh, ride him not! Ah, let him go! Grip him not so hard! Thou shalt have rice! Ah, how good that tastes!"

The exorcist may so delude himself that he may believe that he has power to make the demon converse with him. There may be a falsetto voice like that of the mediums of modern civilization issuing from the patient's mouth, and the exorcist's questions and commands may be answered, and the evil spirit may consent to leave the sufferer in peace. In nervous or mental disorders, in cases of defective power of assimilating food, such a process may exert a soothing and highly beneficial influence on the patient who is actively co-operating by his faith in his own cure, and so the error both as to the cause of the malady and its treatment is perpetuated.

Primitive folk think that life is indestructible; what is called death is but a change of condition to them; even mites and mosquitos are immortal.²

The Tasmanian, when he suffers from a gnawing disease, believes that he has unwittingly pronounced the name of a dead man, who, thus summoned, has crept into his body, and is consuming his liver. The sick Zulu believes that some dead ancestor he sees in a dream has caused his ailment, wanting to be propitiated with the sacrifice of an ox. The Samoan thinks that the ancestral souls can get into the heads and stomachs of living men, and cause their illness and death. These are examples of human ghosts having become demons.³

In the Samoan group people thought that if a man died bearing ill-will towards any one, he would be likely to return to trouble him, and cause sickness and death, taking up his abode in the sufferer's head, chest, or stomach. If he died suddenly, they said he had been eaten by the spirit that took him. In the Georgian and Society Islands evil demons cause convulsions and hysterics, or twist the bowels till the sufferers die writhing in agony. Madmen are thought to be entered

¹ Tylor's *Anthropology*, p. 354.

² Reclus, *Primitive Folk*, p. 103.

³ Dr. E. B. Tylor, art. "Demonology," *Ency. Brit.*

by a god, so they are treated with great respect ; idiots are considered to be divinely inspired.¹ Many other races believe in the inspiration of mentally feeble or insane persons. Amongst the Dacotas spirits of animals, trees, stones, or deceased persons are believed to enter the patient and cause his disease. The medicine-man recites charms over him, and making a symbolic representation of the intruding spirit in bark, shoots it ceremonially ; he sucks over the seat of the pain to draw the spirit out, and fires guns at it as it escapes.

This is just what happened in the West Indies in the time of Columbus. Friar Roman Paul tells of a native sorcerer who pretended to pull the disease from the legs of his patients, blowing it away, and telling it to begone to the mountain or the sea. He would then pretend to extract by sucking some stone or bit of flesh, which he declared had been put into the patient to cause the disease by a deity in punishment for some religious neglect.² The Patagonians believed that sickness was caused by spirits entering the patient's body ; they considered that an evil demon held possession of the sick man's body, and their doctors always carried a drum which they struck at the bedside to frighten away the demons which caused the disorder.³ The Zulus and Basutos in Africa teach that ghosts of dead persons are the causes of all diseases. Congo tribes believe also that the souls of the dead cause disease and death amongst men.

The art of medicine in these lands therefore is, for the most part, merely an affair of propitiating some offended and disease-causing spirit. In several parts of Africa mentally deranged persons are worshipped. Madness and idiocy are explained by the phrase, "he has fiends." The Bodo and Dhimal people of North-east India ascribe all diseases to a deity who torments the patient, and who must be appeased by the sacrifice of a hog. With these people naturally the doctor is a sort of priest. As Mr. Tylor says, "Where the world-wide doctrine of disease-demons has held sway, men's minds, full of spells and ceremonies, have scarce had room for thought of drugs and regimen."⁴

A forest tribe of the Malay Peninsula, called the Original People, are said to have no religion, no idea of any Supreme Being, and no priests ; yet their Puyung, who is a sort of general adviser to the tribe, instructs them in sorcery and the doctrine of ghosts and evil spirits. In sickness they use the roots and leaves of trees as medicines. Amongst

¹ Ellis, *Polyn. Res.*, vol. i. pp. 363, 395 ; vol. ii. pp. 193, 274. Schoolcraft, part iv. p. 49.

² Roman Paul, xix., in *Life of Colon*.

³ D'Orbigny, *L'Homme Américain*, vol. ii. pp. 207, 231 (Caribs).

⁴ *Primitive Culture*, vol. ii. p. 131.

the Tarawan group of the Coral Islands, Pickering says : " Divination or sorcery was also known, and the natives paid worship to the manes or spirits of their departed ancestors." ¹ Probably on careful investigation we should find that in these cases the doctrine of ghosts and the worship of spirits has some connection with the causation of disease.

The Malagasy profess a religion which is chiefly fetishism. They believe in the life of the spirit, which they call "the essential part of me," apart from the body ; and they believe that this spirit exists when the body dies. Such "ghosts" they consider can do harm in various ways, especially by causing diseases ; consequently they endeavour, as the chief means of cure, to appease the offended ghost. Witchcraft and belief in charms naturally flourish amongst these people. ²

Mr. A. W. Howitt says that the Kurnai of Gippsland, Australia, believe that a man's spirit (*Yambo*) can leave the body during sleep, and hold converse with other disembodied spirits. Another tribe, the Woi-worung, call this spirit *Mürup*, and they suppose it leaves the body in a similar manner, the exact moment of its departure being indicated by the "snoring" of the sleeper. As a theory of the soul, Mr. Howitt says : "It may be said of the aborigines I am now concerned with, and probably of all others, that their dreams are to them as much realities in one sense, as are the actual events of their waking life. It may be said that in this respect they fail to distinguish between the subjective and objective impressions of the brain, and regard both as real events." ³

They believe that these ghosts live upon plants, that they can revisit their old haunts at will, and communicate with the wizards or medicine-men on being summoned by them. A celebrated wizard amongst the Woi-worung caught the spirit of a dying man, and brought it back under his 'possum rug, and restored it to the still breathing body just in time to save his life. The ghosts can kill game with spiritually poisoned spears. Even the tomahawk has a spirit, and this belief explains many burial customs. One of the Woi-worung people told Mr. Howitt that they buried the weapon with the dead man, "so that he might have it handy." Other tribes bury with the corpse the amulets and charms used by the deceased during life, in case they may be required in the spirit-world. The Woi-worung believe that their wizards could send their deadly magical *yarük*, or rock crystal, against a person they desired to kill, in the form of a small whirlwind. They believe that their wizards "go up" at night to the sky, and obtain such information as

¹ *Races of Man*, p. 61.

² Dr. G. W. Parker, on "The People of Madagascar," *Journ. Anthropol. Inst.*, 1883, p. 478.

³ *Journ. Anthropol. Inst.*, 1884, p. 187.

they require in their profession. They can also bring away the magical apparatus by which some one of another tribe might be injuring the health of a member of his own tribe. It is highly probable that in these Australian beliefs we have the counterparts of those which were everywhere held by primitive man. Good spirits are very little worshipped by savages ; they are already well disposed, and need no invocation ; it is the bad ones who must be propitiated by an infinite variety of rites and sacrifices. "Thus," as Professor Keane says, "has demonology everywhere preceded theology."¹

Mr. Edward Palmer, in *Notes on Some Australian Tribes*, says that the Gulf tribes believe in spirits which live inside the bark of trees, and which come out at night to hold intercourse with the doctors, or "mediums." These spirits work evil at times. The Kombinegherry tribe are much afraid of an evil-working spirit called *Tharragarry*, but they are protected by a good spirit, *Coomboorah*. The Mycoolon people believe in an invisible spear which enters the body, leaving no outward sign of its entry. The victim does not even know that he is hurt ; he goes on hunting, and returns home as usual ; in the night he becomes ill, delirious, or mad, and dies in the morning. *Thimmool* is a pointed leg-bone of a man, which, being held over a blackfellow when asleep, causes sickness or death. The *Marro* is the pinion-bone of a hawk, in which hair of an enemy has been fixed with wax. To work a charm on him a fire circle is made round it. With this charm they can make their enemy sick, or, by prolonging their magic, kill him. When they think they have done harm enough, they place the *Marro* in water, which removes the charm.²

Mr. H. H. Johnstone says that the tribes on the Lower Congo bury with any one of consequence bales of cloth, plates, beads, knives, and other things required to set the deceased up in the spirit-life on which he has entered. The plates are broken, the beads are crushed, and the knives bent, so as to kill them, that they too may "die," and go to the spirit-land with their owner.³

This is a valuable confirmation of the doctrine of animism.

As Mr. Herbert Spencer says :⁴ "It is absurd to suppose that uncivilized man possesses at the outset the idea of 'natural explanation.'" At a great price has civilized man purchased the power of giving a natural explanation to the phenomena by which he is surrounded. As societies grow, as the arts flourish, as painfully, little by little, his

¹ A. H. Keane, *On the Botocudos*.

² *Journ. Anthropol. Inst.*, 1884, p. 293.

³ *Ibid.*, p. 475.

⁴ *Principles of Sociology*, vol. i. p. 222.

experiences accumulate, so does man learn to correct his earlier impressions, and to construct the foundations of science. It is the natural, or it would not be the universal, process for primitive man to explain phenomena by the simplest methods, and these always lead him to his superstitions. It is the only process open to him. The activity which he sees all around him is controlled by the spirits of the dead, and by spirits more or less like those which animate his fellow-men.

Clement of Alexandria says that all superstition arises from the inveterate habit of mankind to make gods like themselves. The deities have like passions with their worshippers, "and some say that plagues, and hailstorms, and tempests, and the like, are wont to take place, not alone in consequence of material disturbance, but also through the anger of demons and bad angels. These can only be appeased by sacrifice and incantations. Yet some of them are easily satisfied, for when animals failed, it sufficed for the magi at Cleone to bleed their own fingers." ¹

"The prophetess Diotima, by the Athenians offering sacrifice previous to the pestilence, effected a delay of the plague for ten years." ²

¹ Clem. Alex., *Miscellanies*, book vi.

² *Ibid.*

CHAPTER IV.

MAGIC AND SORCERY IN THE TREATMENT OF DISEASE.

These originated partly in the Desire to cover Ignorance.—Medicine-men.—Sucking out Diseases.—Origin of Exorcism.—Ingenuity of the Priests.—Blowing Disease away.—Beelzebub cast out by Beelzebub.—Menders of Souls.—“Bringing up the Devil.”—Diseases and Medicines.—Fever Puppets.—Amulets.—Totemism and Medicine.

DR. ROBERTSON tells us that the ignorant pretenders to medical skill amongst the North American Indians were compelled to cover their ignorance concerning the structure of the human body, and the causes of its diseases, by imputing the origin of the maladies which they failed to cure to supernatural influences of a baleful sort. They therefore “prescribed or performed a variety of mysterious rites, which they gave out to be of such efficacy as to remove the most dangerous and inveterate malice. The credulity and love of the marvellous natural to uninformed men favoured the deception, and prepared them to be the dupes of those impostors. Among savages, their first physicians are a kind of conjurers, or wizards, who boast that they know what is past, and can foretell what is to come. Thus, superstition, in its earliest form, flowed from the solicitude of man to be delivered from present distress, not from his dread of evils awaiting him in a future life, and was originally ingrafted on medicine, not on religion. One of the first and most intelligent historians of America was struck with this alliance between the art of divination and that of physic among the people of Hispaniola. But this was not peculiar to them. The *Alexis*, the *Piayas*, the *Autmoins*, or whatever was the distinguishing name of the diviners and charmers in other parts of America, were all physicians of their respective tribes, in the same manner as the *Buhitos* of Hispaniola. As their function led them to apply to the human mind when enfeebled by sickness, and as they found it, in that season of dejection, prone to be alarmed with imaginary fears, or assured with vain hopes, they easily induced it to rely with implicit confidence on the virtue of their spells and the certainty of their predictions.”¹

The aborigines of the Amazon have a kind of priests called *Pagés*,

¹ *History of America*, book iv. 7.

like the medicine-men of the North American Indians. They attribute all diseases either to poison or to the charms of some enemy. Of course, diseases caused by magic can only be cured by magic, so these powerful priest-physicians cure their patients by strong blowing and breathing upon them, accompanied by the singing of songs and by incantations. They are believed to have the power to kill enemies, and to afflict with various diseases. As they are much believed in, these *pagés* are well paid for their services. They are acquainted with the properties of many poisonous plants. One of their poisons most frequently used is terrible in its effects, causing the tongue and throat, as well as the intestines, to putrefy and rot away, leaving the sufferer to linger in torment for several days.¹

Amongst many savage tribes their medicine-men pretend to remove diseases by sucking the affected part of the body. They have previously placed bits of bone, stones, etc., in their mouths, and they pretend they have removed them from the patient, and exhibit them as proofs of their success. The Shaman, or wizard-priest of the religion still existing amongst the peoples of Northern Asia, who pretends to have dealings with good and evil spirits, is the successor of the priests of Accad; thus is the Babylonian religion reduced to the level of the heathenism of Mongolia.

The aborigines of the Darling River, New South Wales, believe that sickness is caused by an enemy, who uses certain charms called the *Yountoo* and *Molee*. The *Yountoo* is made from a piece of bone taken from the leg of a deceased friend. This is wrapped up in a piece of the dried flesh from the body of another deceased friend. The package is tied with some hair from the head of a third friend. When this charm is used against an enemy, it is taken to the camp where he sleeps, and after certain rites are performed it is pointed at the person to be injured. The doctor of the tribe attributes disease to this sort of enchantment, and pretends to suck out of his patient the piece of bone which he declares has entered his body and caused the mischief. The *Molee* is a piece of white quartz, which is pointed at the victim with somewhat similar ceremonies and consequences. The possessors of these powerful charms take care to hide them from view. When the doctor, or *Maykeeka*, sucks out the *Yountoo*—bone chip—from his patient, he must throw it away. The *Molee* must be cast into water.

Mr. F. Bonney read a paper on "Some Customs of the Aborigines of the River Darling," before the Anthropological Society of Great Britain, May 8th, 1883, in which the process of curing diseases is described. He says: "On one occasion, when I was camped in the Purnanga

¹ Wallace, *Travels on the Amazon*, chap. xvii.

Ranges, I watched by the light of a camp-fire a doctor at work, sucking the back of a woman who was suffering from pains in that part. While she sat on a log a few yards distant from the camp-fire, he moved about her, making certain passes with boughs which he held, and then sucked for some time the place where pain was felt; at last he took something from his mouth, and, holding it towards the firelight, declared it to be a piece of bone. The old women sitting near loudly expressed their satisfaction at his success. I asked to be allowed to look at it, and it was given to me. I carelessly looked at it, and then pretended to throw it into the fire, but, keeping it between my fingers, I placed it in my pocket, when I could do so unobserved; and on the following morning, when I examined it by daylight, it proved to be a small splinter of wood, and not bone. At the time the patient appeared to be very much relieved by the treatment." Another mode of treatment described by Mr. Bonney is that of sucking poison, supposed to have been sent into the patient by an enemy, through a string. The patient complained of sickness in the stomach; the woman doctor placed the patient on her back on the ground, tied a string round the middle of her naked body, leaving a loose end about eighteen inches long. The doctress then began sucking the string, passing the loose end through her mouth, from time to time spitting blood and saliva into a pot. She repeated this many times, until the patient professed to be cured.

The people of Timor-laut, near the island of New Guinea, scar themselves on the arms and shoulders with red-hot stones, in imitation of immense small-pox marks, in order to ward off that disease.¹

Among the Kaffirs diseases are all attributed to three causes—either to being enchanted by an enemy, to the anger of certain beings whose abode appears to be in the rivers, or to the power of evil spirits.²

"Among the Kalmucks," says Lubbock, "the cures are effected by exorcising the evil spirit. This is the business of the so-called 'priests,' who induce the evil spirit to quit the body of the patient and enter some other object. If a chief is ill, some other person is induced to take his name, and then, as is supposed, the evil spirit passes into his body."³

Pritchard tells us that "the priests of the Negroes are also the physicians, as were the priests of Apollo and Æsculapius. The notions which the Negroes entertain of the causes of diseases are very different. The Watje attribute them to evil spirits whom they call Dobbo. When

¹ *Journ. Anthropol. Inst.*, 1884, p. 10.

² Forrest, *Journ. Anthropol. Inst.*, vol. iii. p. 319.

³ *Origin of Civilization*, p. 26.

these are very numerous, they ask of their sacred cotton-tree permission to hunt them out. Hereupon a chase is appointed, and they do not cease following the demons with arms and great cries until they have chased them beyond their boundaries. This chase of the spirits of disease is very customary among many nations of Guinea, who universally believe that many diseases arise from enchantment, and others by the direction of the Deity." ¹

It is interesting to note, as showing the ingenuity of the priests, that during the extremely dangerous rainy season the doctors' remedies are of very little use; then the priests say this is because the gods at this particular season are obliged to appear at the court of the superior deity. During their absence at court, the priests cannot obtain access to them; and as without their advice they could not efficaciously prescribe, such medicines as they offer have little good effect.

The Antilles Indians in Columbus's time went through the pretence of pulling the disease off the patient and blowing it away, telling it to begone to the sea or the mountains.

That the disease-demon may often be blown away by a plentiful supply of fresh air is now an article of every hygienist's creed.

The Badaga folk, mountaineers of the Neilgherries, insure their children against accidents and sickness by talismans made of the earth and ashes of funeral pyres. They think the souls of the departed are so vexed at finding themselves in a novel condition that they are liable to kill people even without a motive. When an epidemic breaks out, they lay the blame on the person who died last, who is going about the country taking vengeance on his kindred.²

Monier Williams says they endeavour to induce the demon of pestilence, of typhoid fever, of the plague of rats or caterpillars, to enter into the body of a dancer, who acts as a medium and has power to exorcise the angry spirit. He has power to let loose rot or farcy amongst the flocks and herds, so the medium has to be conciliated. The Corumba of these mountain people is a wizard, the sicknesses of men and animals are all set down to his account. "Gratified by the evil reputation the Corumba enjoy, they offer to undo what they are supposed to have done, to remove the spells they are accused of having cast. The wheat is smutty, the flocks have the scab? Somebody's head aches, some one's stomach is out of order? One of these rogues turns up, offers to eject the demon; as it happens, the evil spirit is one of his particular cronies! He will cast out Beelzebub by Beelzebub."³

Amongst the Western Inoits, says Elie Reclus,⁴ the magician of the

¹ *Nat. His. Man.*, p. 535.

³ *Primitive Folk*, p. 237.

² Reclus, *Primitive Folk*, p. 232.

⁴ *Ibid.*, p. 80.

people is called *Angakok*, signifying the "Great" or "the Ancient," and he is guide, instructor, wonder-worker, physician, and priest. He accumulates in himself all influences; "he is public counsellor, justice of the peace, arbitrator in public and private affairs, artist of all kinds, poet, actor, buffoon." Supposed to be in contact and close communication with the superior beings of the world of spirits, and to harbour in his body many demons of various kinds, he is supposed to be invested with omnipotence, he can chase away the disease-demons, and put even death itself to flight. The *angakok* defends his people from the demons who take the form of cancers, rheumatism, paralysis, and skin diseases. He exorcises the sick man with stale urine, like the Bochimán poison-doctors.¹

The Cambodians exorcise the small-pox demon with the urine of a white horse.²

Thiers (*Des Superstitions*), quoted by Reclus, says that Slavonic rustics asperse their cattle with herbs of St. John boiled in urine to keep ill-luck away from them; and that French peasant women used to wash their hands in their own urine, or in that of their husbands and children, to prevent evil enchantments doing them harm. Reclus says: "When a diagnosis puzzles an *angakok*, he has recourse to a truly ingenious proceeding. He fastens to the invalid's head a string, the other end of which is attached to a stick; this he raises, feels, balances on his hand, and turns in every direction. Various operations follow, having for their object the forcible removal of the spider from the luckless wretch whose flesh it devours. He will cleanse and set to rights as much as he is able—whence his name 'Mender of Souls.' A wicked witch, present though invisible, can undo the efforts of the conjurer, and even communicate to him the disease, rendering him the victim of his devotion; black magic can display more power than white magic. Then, seeing the case to be desperate, the honest *angakok* summons, if possible, one or more brethren, and the physicians of souls strive in concert to comfort the dying man; with a solemn voice they extol the felicities of Paradise, chanting softly a farewell canticle, which they accompany lightly upon the drum."³

The superstitious natives of the Lower Congo have a singular custom, when anybody dies, of compelling some victim or other to drink a poison made from the bark of the *Erythrophloeum guineensis*. It usually acts as a powerful emetic, and is administered in the hope that it may "bring up" the devil. Their medicine-man is called *nganga*, and he is taught a language quite different from the ordinary tongue,

¹ Th. Halm, *Globus*, xviii.

² Landas, *Superstitions Annamites*.

³ *Primitive Folk*, pp. 83, 84.

and this is kept secret from females. "No one," says Mr. H. H. Johnston ("On the Races of the Congo"),¹ "has yet been able to examine into their sacred tongue." The use of Latin by civilized doctors is not unlike this African custom.

The mountaineers of the Neilgherries endeavour to induce the demon they invoke to enter into the body of the "medium," a dancer who pretends to the intoxication of prophecy. If they can persuade the demon of pestilence or typhoid fever to enter into the medium, it becomes possible to act upon and influence him.²

The people of Tartary make a great puppet when fever is prevalent, which they call the Demon of Intermittent Fevers, and which when completed they set up in the tent of the patients.

Mr. Forbes, in his account of the tribes of the island of Timor, says that the natives believe all diseases to be the result of sorcery, and they carry a variety of herbs and charms to avert its influence. He says: "I had as a servant an old man, who one morning complained of being in a very discomposed and generally uncomfortable state, and of being afraid he was going to die. He had seen, he said, the spirit of his mother in the night, she had been present by him and had spoken with him. He feared, therefore, that he was about to die. He begged of me some tobacco and rice to offer to her, which I gave him. He retired a little way to a great stone in the ground, and laying on it some betel and pinang, with a small quantity of chalk, along with a little tobacco and rice, he repeated for some eight or ten minutes an invocation which I did not understand. The rice and the chalk he left on the stone, which were very shortly after devoured by my fowls; the tobacco, betel, and pinang he took away again, to be utilised by himself."³

When the medicine-man of these tribes calls to see a patient, he looks very closely at him, to endeavour to perceive the sorcerer who is making him ill. Then he returns to his home and makes up some medicines, which the happy patient has not however to swallow, but the drugs having been packed by the doctor into a bundle with a small stone, are thrown away as far as possible from the sick man; the stone finds out the sorcerer and returns to the doctor, who gives it to his patient and tells him it will cure him if he will wear it about his neck. This affords another illustration of the universal belief of the value of amulets in medicine.

Medicine amongst certain tribes has a connection with the adoration of particular objects and animals believed to be related to each

¹ *Journ. Anthropol. Inst.*, 1884, p. 473.

² Prof. Monier Williams, and Reclus, *Primitive Folk*, p. 234.

³ *Journ. Anthropol. Inst.*, 1884, p. 427.

separate stock or blood-kindred of human beings, and which is known in anthropology as totemism. The Algonquin Indians use the name, Bear, Wolf, Tortoise, Deer, or Rabbit to designate each of a number of clans into which the race is divided. The animal is considered as an ancestor or protector of the tribe.

In considering the institutions of "totemism" and "medicine," we must not forget that savage "medicine" has a function somewhat different from that of medicine in our sense of the word. Some doubt if there be any real distinction between the totem and the medicine.¹

Schoolcraft says that among the Sioux a clan consists of individuals who use the same roots for medicine, and they are initiated into the clan by a great *medicine-dance*. The Sioux and other tribes make a bag out of the skin of the medicine (totem ?) animal, which acts as a talisman, and is inherited by the son. Here we have an instance of the reverence inspired by an inherited medicine. It is a little surprising that we have so few evidences of the worship of healing herbs and drugs.

Demon-worship is the explanation of the mysteries of Dionysus Zagreus and the Chthonic and Bacchic orgies. M. Reclus says : " If we knew nothing otherwise of these orgies, we could obtain a sufficiently correct idea of them by visiting the Ghâts, the Neilgherries, and the Vindhya." ²

¹ Starcke, *Primitive Family*, p. 32.

² *Primitive Folk*, p. 234.



THE MEDICINE-DANCE OF THE NORTH AMERICAN INDIANS.

CHAPTER V.

PRIMITIVE MEDICINE.

Bleeding.—Scarification.—Use of Medicinal Herbs amongst the Aborigines of Australia, South America, Africa, etc.

THE Healing Craft of many of the northern tribes of Australia is thus described by Mr. Palmer :—

“Among the northern tribes many devices and charms are resorted to in the cases of pains and sickness. The doctors are men who, it is supposed, possess great powers of healing, some of which they obtain from the spirits. They use stones and crystals to put away sickness from any one, and sometimes they bandage the afflicted part with string tightly till no part of the skin is visible. One common plan of alleviating pain is by bleeding, supposing that the pain comes away with the blood. For this minute cuts are made through the skin with pieces of broken flint, or the edge of a broken mussel-shell, over the part affected, and the blood is wiped off with a stick. Sometimes the doctor ties a string from the sick place, say the chest, and rubs the end of it across his gums, spitting into a kooliman of water, and passing the string through also; he then points to the blood in the water as evidence of his skill in drawing it from the sick person. Stones are sucked out with the mouth, and exhibited as having been taken from the body. A good number of plants are used in sickness as drinks, and for external application. A broken arm is cured with splints made of bark and wound round tightly. Snake-bite is cured by scarifying and sucking the wound, and by then using a poultice of box-bark, bruised and heated.”¹

Mr. E. Palmer says that “the Australian aborigines possessed a considerable knowledge of indigenous plants, and their acquaintance with natural history was very accurate. They could only have obtained this knowledge by close observation and generations of experience. With the extermination of the blacks this information has completely died out, and it can only now be obtained in far-distant places like North Queensland, where the aborigines have not been killed off by contact

¹ *Journ. Anthropol. Inst.*, 1884, p. 299.

with civilization. They have much experience in the healing virtues and properties of plants, as also of the kinds best suited for poisoning fish."¹ Great skill is exhibited by their mode of preparing plants by fire and water and other processes, before using them as food; if partaken of in their natural state, many of them would be very deleterious, if not actually poisonous. The *Dioscorea sativa*, or karro plant, has large tubers, which are first roasted, then broken in water and strained or squeezed through fine bags made of fibre into long bark troughs, then the product is washed in many waters, the sediment is well stirred while the water is poured in; by this means the bitter principle is extracted, and a yellow fecula like hominy is produced. *Careya australis* has a root which is used to poison fish, though its fruit is eaten uncooked by the natives. Manna is gathered from *Eucalyptus terminalis*. *Cymbidium caniculatum* is used for dysentery and other bowel disorders. The nuts of the *Cycas media* are very poisonous unless prepared by fire and water, and then they can be used as food. The seeds of *Entada scandens* are only fit for eating after baking and pounding, as is the case with many other plants cleverly manipulated by the blacks. The leaves of *Ocimum sanctum* are infused in water and drunk for sickness. A wash is made from the bruised bark of the gutta-percha tree, *Excacaria parviflora*. The leaves of *Loranthus quandong*, the mistletoe of the *Acacia hemalophylla*, are infused in water and drunk for fevers, ague, etc.; it is doubtful whether they have any virtue, but mistletoe was once a very highly prized medicine in Europe, though now wholly obsolete. The leaves of *Melaleuca leucadendron* are used in infusion for headache, colds, and general sickness. The *melaleuca* is the cajeput tree, and cajeput oil is undoubtedly a valuable medicine. Stillé says, "It is of marked utility in cases of nervous vomiting, nervous dysphagia, dyspnœa, and hiccup."² Externally it is valuable in nervous headache and neuralgia.

The natives make great use medicinally of the various species of eucalyptus. The leaves of *Eucalyptus tetradonta* are made into a drink for fevers and sickness with headache, etc. The *Eucalyptus globulus* recently introduced into civilized medicine comes from Australia. *Plectranthus congestus*, *Pterocaulon glandulosus*, *Gnaphalium luteo-album* (several of this species are used in European medicine in bronchitis and diarrhœa, and one of them is called "Life Everlasting"), *Heliotropium ovalifolium*, and *Moschosma polystachium*, are all used in the medical practice of these despised aborigines, and are probably quite as valuable as the majority of the herbs recommended in our old herbals and pharmacopœias.

¹ *Journ. Anthropol. Inst.*, 1884, p. 310.

² *National Dispensatory*, p. 986.

The aborigines of the north-western provinces of South America have long been famous for their extensive knowledge of the properties of medicinal plants, and even now they possess secrets for which we may envy them.¹

The arrow-poison used by the Indians of the interior is made from a plant of the strychnos family. Those of the Pacific coast prepare a poison from the secretion exuding from the skin of a small frog; this by a certain process of decomposition they convert into a powerful blood-poison. It is said that when these tribes were preparing poisons for use in time of war, it was their ancient practice to test their efficacy on the old women of the tribe, and not on the lower animals, exhibiting in this respect a superior knowledge of toxicology than is shown by those pharmacologists of our own day who test on animals the drugs they propose administering to man. Mr. R. B. White, in his notes on these aboriginal tribes, says that the Indians in the State of Antioquia were in the habit of poisoning the salt springs in the time of the Spanish invasion; they covered the spring with branches of a tree called the "Doncel," which imparted such venomous properties to the water that after a lapse of three hundred years it still retains its deadly properties; when animals now get at the water, as many as three horses have been known to be killed in one night by drinking it.²

The study of the means of capturing fish by poisoning the water—a practice which is universal amongst savages—must have led to many observations on the properties of poisonous plants. Some considerable knowledge of the risks and uses of various leaves and berries must have been acquired in this way. The people of Timor-laut intoxicate fish with rice steeped in poisonous climbing plants.³

The aborigines of the River Darling, New South Wales, feed their very sick and weak patients upon blood drawn from the bodies of their male friends. It is generally taken raw by the invalid, sometimes however it is slightly cooked by putting hot ashes in it.⁴

The practice is disgusting, but scarcely more so than one which was prescribed a few years ago by the great physicians of Paris, who ordered their anæmic patients to drink hot blood from the slaughtered oxen at the *abattoirs*. Mr. Bonney says that the aborigines referred to willingly bleed themselves till they are weak and faint to provide the food they consider necessary for the sick person.

The acacias are very abundant in Australia, in India, and Africa. This order of plants produces gum arabic and gum senegal. The Tasmanians use the gum of *Acacia sophora* as a food.

¹ *Journ. Anthropol. Inst.*, 1884, p. 251.

² *Ibid.* p. 11.

³ *Ibid.*, p. 251.

⁴ *Ibid.*, p. 132.

The eucalyptus or blue-gum tree grows on the hills of Tasmania and in Victoria on the mainland of Australia ; it was introduced into Europe in 1856, and has been very extensively used as a remedy for intermittent fever, influenza, and as a powerful disinfectant.

"As in all similar cases," says Stillé, "the discovery of its virtues was accidental. It is alleged that more than forty years ago the crew of a French man-of-war, having lost a number of men with 'pernicious fever,' put into Botany Bay, where the remaining sick were treated with eucalyptus, and rapidly recovered. It is also said that the virtues of the tree were well known to the aboriginal inhabitants."

A good illustration of the ways in which the properties of plants have been discovered, and of the relation of poisonous to harmless herbs, may be found in the practice of the American Indians in their use of the *manioc*, a large shrub producing roots somewhat like parsnips. They carefully extract the juice, which is a deadly poison, and then grate the dried roots to a fine powder, which they afterwards convert into the *cassava* bread. How was this treatment of the root discovered? It was simply due to the fact that one species of the shrub is devoid of any poisonous property, and has only to be washed and may then be eaten with impunity. No doubt this non-poisonous root was the first which was used for food ; then when the supply ran short they were driven by necessity to find out the way to use the almost identical root of the poisonous variety, which when divested of its juice is even better for food than the harmless root. Probably this was only discovered after many experiments and fatalities. "Necessity, the mother of invention," in this as in most other things, ultimately directed the natives to the right way of dealing with this article of diet.

The male fern is a very ancient remedy for tape-worm, and to the present day physicians have found nothing so successful for removing this parasite. The plant is indigenous to Canada, Mexico, South America, India, Africa, and Europe. The negroes of South America have long used worm-seed (*Chenopodium anthelminticum*) as a vermifuge for lumbricoid worms. The plant grows wild in the United States, and has been introduced into the Pharmacopœia as a remedy especially adapted for the expulsion of the round-worms of children. Kousso (*Brayera anthelmintica*) has been employed from time immemorial in Abyssinia for the expulsion of tape-worm. It has been introduced into the British Pharmacopœia.

Some tribes of the Upper Orinoco, Rio Negro, etc., have been known to subsist for months on no other food than an edible earth, a kind of clay containing oxide of iron, and which is of a reddish-brown colour.

M. Cortambert, at a meeting of the Geographical Society in 1862, described this singular food, and said it seemed to be rather a stay for the stomach than a nourishment. Some white people in Venezuela have imitated the earth-eaters, and do not despise balls of fat earth.¹

Savages require much larger doses of drugs than civilized people. Mr. Bonney relates² that he usually gave the aborigines of New South Wales half a pint or more of castor oil for a dose. Another man took three drops of croton oil as an ordinary dose.

Professor Bentley in 1862-63 contributed to the *Pharmaceutical Journal* a series of articles on New American Remedies which have been introduced into medical practice in consequence of their reputation amongst the Indians. Yellow-root (*Xanthorrhiza apiifolia*) has long been employed by the various tribes of North American Indians as a tonic, and may be compared to quassia or calumba root. It is included in the United States Pharmacopœia. Its active principle seems to be *berberine*.

The blue Cohosh plant (*Caulophyllum thalictroides*) has for ages been used by the aborigines of North America as a valuable remedy for female complaints. A tea of the root is employed amongst the Chippeway Indians on Lake Superior as an aid to parturition. The earliest colonists obtained their knowledge of the virtues of the blue cohosh from the natives, and it has for many years been a favourite diuretic remedy in the States. Its common names are pappoose-root, squaw-root, and blueberry-root. Its active principle is called *caulophyllin*.

Twin-leaf (*Jeffersonia diphylla*) is a popular remedy in Ohio and other North American States in rheumatism. It is called *rheumatism-root*. In chemical composition it is similar to senega.

Blood-root, or puccoon (*Sanguinaria canadensis*), has been used for centuries by North American Indians as a medicine. It has been introduced into the United States Pharmacopœia. It is an alterative, and is useful in certain forms of dyspepsia, bronchitis, croup, and asthma. Its physiological action, however, bears no relation to its medicinal uses (*Stillé and Maisch*). Its active principle is *sanguinarina*.

Sarracenia purpurea, Indian cup, or side-saddle plant, is a native of North America, and much used by the Indians in dyspepsia, sick headache, etc.

The valuable bitter stomachic and tonic calumba-root comes to us from the forests of Eastern Africa, between Ibo and the Zambesi. Its

¹ *Wh. Jour.*, vol. iv., 2nd sec., p. 519.

² *Journ. Anthropol. Inst.*, 1884, p. 132.

African name is *kalumb*; it depends for its therapeutic value on the berberine which it contains, and which is found in several other plants. The natives of tropical Africa, the North American Indians, and the semi-barbarian tribes of Hindostan and China have all been impressed with the medicinal value of berberine. Before quinine was commonly used in medicine, this valuable drug was estimated most highly for its very similar properties. There can be no doubt that it was introduced into medicine by savages.

Jalap comes to us from Mexico. It was named from the city of Xalapa.

Cinchona bark was used by the savages of Peru long before it was introduced into European medicine.

Guaiacum, so valuable in chronic rheumatism, was introduced into European medicine from the West India Islands and the northern coasts of South America.

The excellent and popular tonic, quassia-wood, reaches us from Jamaica.

Logwood, a valuable astringent, largely used in diarrhœa, is a native of Campeachy and other parts of Central America, and grows in the West India Islands and India.

Copaiba, an oleo-resin from the copaiva tree, comes from the West Indies and tropical parts of America, chiefly from the valley of the Amazon. It is one of our most valuable remedies in diseases of the genito-urinary organs.

Turkey corn, or Turkey pea (*Dicentra, Corydalis formosa*) grows in Canada and as far south as Kentucky. It has a reputation as a tonic, diuretic and alterative medicine, and is used in skin diseases, syphilis, etc.

The negroes use the prickly ash, or tooth-ache shrub (*Xanthoxylum fraxineum*), as a blood purifier, especially in the spring. It has long been officinal in the United States Pharmacopœia, and is considered highly serviceable in chronic rheumatism.

The shrubby trefoil (*Ptelea trifoliata*) is a North American shrub, much valued in dyspepsia, and as a stimulant in the typhoid state. Its active principle is *berberine*.

The above are merely a few examples taken at random of the valuable medicinal plants used by savages and primitive peoples.

Thus, as might have been expected, the discovery of the Americas led to the introduction of many new drugs into medical practice.

Savages eat enormously.

Wrangel says each of the Yakuts ate in a day six times as many fish as he could eat. Cochrane describes a five-year-old child of this race

as devouring three candles, several pounds of sour frozen butter, and a large piece of yellow soap, and adds : "I have repeatedly seen a Yakut, or a Yongohsi, devour forty pounds of meat in a day."¹

Yet the savage is less powerful than the civilized man. "He is unable," says Spencer, "to exert suddenly as great an amount of force, and he is unable to continue the expenditure of force for so long a time." •

¹ Herbert Spencer's *Principles of Sociology*, vol. i. p. 50.

CHAPTER VI.

PRIMITIVE SURGERY.

Arrest of Bleeding.—The Indian as Surgeon.—Stretchers, Splints, and Flint Instruments.—Ovariectomy.—Brain Surgery.—Massage.—Trepanning.—The Cæsarean Operation.—Inoculation.

PRIMITIVE man, from the earliest ages, must have been a diligent student of medicine ; it has indeed been wisely said that the first man was the first physician. That is to say, he must have been at least as careful to avoid noxious things and select good ones as the beasts, and, as in the lowest scale, he must have been able in some degree to observe, reflect, and compare one thing with another, and so find out what hurt and what healed him, he would at once begin to practise the healing art, either that branch of it which is directed towards maintaining the health or that of alleviating suffering. When his fellow-men were sick and died, he would be led to wonder why they perished ; and when other men stricken in like manner recovered, he would speculate as to the causes of their cure. It is probable that at first little attention was paid to the loss of blood when an artery was severed. Soon, however, it would be remarked that under such conditions the man would faint, and perhaps die. In process of time it would be observed that when the injured blood-vessel was by any means, natural or artificial, closed, the man quickly recovered. Then some one wiser than the other would bind a strip of fibre or a piece of the skin of a beast around the bleeding limb, and the hæmorrhage would cease, and the operator would gain credit and reward. He would then, naturally, give himself airs, and pretend, in course of time, to some importance, and so become a healer by profession. It would soon be noticed that those who, in the search for berries in the woods, ate of certain kinds, more or less promptly died, and those who had abstained from their use survived. It would be understood that such berries must not be eaten. Or again, a man suffering from some pain in his stomach would eat of a particular plant that seemed good for food, and his pain would be relieved : it might be ages before primitive man would arrive at the conclusion that there was some connection between the pain and

its disappearance after eating of the plant in question ; but in process of time the two things would be associated, and everybody would use the curative plant for the particular pain.

It is natural to suppose that many such things would happen, and we know as a fact that they have so happened in numberless instances.

Probably empirical medicine, in the most ancient times and amongst the most savage tribes, had an armoury of weapons against pain and sickness not greatly inferior to our own *Materia Medica*. The origin of the use of most of our valuable medicines cannot be discovered.

"As no man can say who it was that first invented the use of clothes and houses against the inclemency of the weather, so also can no investigation point out the origin of medicine—mysterious as the sources of the Nile. There has never been a time when it was not."¹

The origin of surgery is probably much older than that of medicine, if by the term surgery we mean the application of herbs to wounds, either as bandages or on account of their healing properties, and the use of medicinal baths the like. Mr. Gladstone, in an address to a society of herbalists, which was reported in the *Daily News*, 27th March, 1890, said that an accident which occurred to himself, when cutting down a tree, illustrated the very beginning of the healing art. He cut his finger with the axe, and found that he had no handkerchief with him with which to bind up the wound, so he took a leaf of the tree nearest to him, and fastened it round his injured finger. The bleeding stopped at once, and the wound, he declared, healed much more quickly and favourably than previous injuries treated in a more scientific manner. There is no doubt whatever that this is a good example of the primitive manner of treating cuts and other flesh wounds. The cooling properties of leaves would be recognised by the most primitive peoples ; and as a cut or other wound, by the process of inflammation, at once begins to burn and throb, a cooling leaf would be the most natural thing to apply. Some leaves which possess styptic and resinous properties would staunch bleeding very effectually, and the mere act of binding round the cut an application like a leaf would serve to draw together the edges of the wound, and afford an antiseptic plaster of the most scientific nature. It was, in fact, by just such means that the valuable styptic properties of the matico leaves were first discovered by Europeans.

If, in the depths of the forest, an Indian breaks his leg or arm (said Dr. Hingston in his address at the British Medical Association meeting at Nottingham, 1892), splints of softest material are at once improvised. Straight branches are cut, of uniform length and thickness. These are

¹ Sydenham's Works, vol. i. Preface to *Medical Observations*.

lined with down-like moss, or scrapings or shavings of wood ; or with fine twigs interlaid with leaves, if in summer ; or with the curled-up leaves of the evergreen cedar or hemlock, if in winter ; and the whole is surrounded with withes of willow or osier, or young birch. Occasionally it is the soft but sufficiently unyielding bark of the poplar or the bass-wood. Sometimes, when near the marshy margin of our lakes or rivers, the wounded limb is afforded support with wild hay or reeds of uniform length and thickness.

To carry a patient to his wigwam, or to an encampment, a stretcher is quickly made of four young saplings, interwoven at their upper ends, and on this elastic springy couch the injured man is borne away by his companions. When there are but two persons, and an accident happens to one of them, two young trees of birch or beech or hickory are used. Their tops are allowed to remain to aid in diminishing the jolting caused by the inequalities of the ground. No London carriage-maker ever constructed a spring which could better accomplish the purpose. A couple of crossbars preserve the saplings in position, and the bark of the elm or birch, cut into broad bands, and joined to either side, forms an even bed. In this way an injured man is brought by his companion to a settlement, and often it has been found, on arrival, that the fractured bones are firmly united, and the limb is whole again. This is effected in less time than with the whites, for the reparative power of these children of the forest is remarkable. In their plenitude of health, osseous matter is poured out in large quantity, and firm union is soon effected.

The reparative power of the aborigines, when injured, is equalled by the wonderful stoicism with which they bear injuries, and inflict upon themselves severest torture. They are accustomed to cut into abscesses with pointed flint ; they light up a fire at a distance from the affected part (our counter-irritation) ; they amputate limbs with their hunting-knives, checking the hæmorrhage with heated stones, as surgeons were accustomed to do in Europe in the time of Ambroise Paré ; and sometimes they amputate their own limbs with more *sang froid* than many young surgeons will display when operating on others. The stumps of limbs amputated in this primitive manner are well formed, for neatness is the characteristic of all the Indian's handiwork.

The aborigines are familiar with, and practise extensively, the use of warm fomentations. In every tribe their old women are credited with the possession of a knowledge of local bathing with hot water, and of medicated decoctions. The herbs they use are known to a privileged few, and enhance the consideration in which their possessors are held.

The Turkish bath, in a simpler but not less effective form, is well known to them. If one of their tribe suffers from fever, or from the effects of long exposure to cold, a steam bath is readily improvised. The tent of deer-skin is tightly closed; the patient is placed in one corner: heated stones are put near him, and on these water is poured till the confined air is saturated with vapour. Any degree of heat and any degree of moisture can be obtained in this way. Europeans often avail themselves of this powerful sudatory when suffering from rheumatism.

The aborigines have their herbs—a few, not many. They have their emetics and laxatives, astringents and emollients—all of which are proffered to the suffering without fee or reward. The “Indian teas,” “Indian balsams,” and other Indian “cure-alls”—the virtues of which it sometimes takes columns of the daily journals to chronicle—are not theirs. To the white man is left this species of deception.¹

Mr. E. Palmer says that there is a tribe of Australian aborigines, called “Kalkadoona,” adjoining the Mygoodano tribe of the Cloncurry, who practise certain surgical operations at their *Bora* initiations of youths. They operate on the urethra with flint knives. The same custom can be traced from the Cloncurry River to the Great Australian Bight in the south. The females are in some of the south-western tribes operated on in some manner to prevent conception. It is supposed that the ovary is taken out, as in the operation of spaying.²

Such operations are sometimes performed with a mussel-shell.

Sir John Lubbock says of the Society Islanders that “they had no knowledge of medicine as distinct from witchcraft; but some wonderful stories are told of their skill in surgery. I will give perhaps the most extraordinary. ‘It is related,’ says Mr. Ellis, ‘although,’ he adds with perfect gravity, ‘I confess I can scarcely believe it, that on some occasions, when the brain has been injured as well as the bone, they have opened the skull, taken out the injured portion of the brain, and, having a pig ready, have killed it, taken out the pig’s brains, put them in the man’s head and covered them up.’”³

Massage in one form or another has been practised from immemorial ages by all nations. Captain Cook tells us, in his narrative of the people of Otaheite, New Holland, and other parts of Oceania, that they practise massage in a way very similar to that which is employed by more civilized nations. For the relief of muscular fatigue they resort to a process which they call *toogi-toogi*, or light percussion regularly applied

¹ See *British Medical Journal*, July 30th, 1892, p. 238.

² *Journ. Anthropol. Inst.*, 1884, p. 295.

³ Lubbock, *Prehistoric Times*, p. 483. Ellis, vol. ii. p. 277.

for a long time. They also employ kneading and friction under the names of Miti and Fota. African travellers inform us that the medicine-men use these processes for the relief of injuries to the joints, fractures, and pain of the muscles. Our word shampooing is said to have been derived from the Hindu term *chamboning*. Dr. N. B. Emerson, in 1870, gave an account of the *lomi-lomi* of the Sandwich Islanders. He says that, "when footsore and weary in every muscle, so that no position affords rest, and sleep cannot be obtained, these manipulations relieve the stiffness and soothe to sleep, so that the unpleasant effects of excessive exercise are not felt the next day, but an unwonted suppleness of joint and muscle comes instead."¹

When we receive a blow or strike our bodies against a hard substance, we instinctively rub the affected part. This is one of the simplest and most effectual examples of natural surgery. When the emollient properties of oil were discovered, rubbing with oil, or inunction, was practised. The use of oil for this purpose in the East is extremely ancient. Amongst the Greeks there was a class of rubbers who anointed the bodies of the athletes. The oil was very thoroughly rubbed in, so that the pores of the skin were closed and the profuse perspiration thereby prevented. After the contest the athlete was subjected to massage with oil, so as to restore the tone of the strained muscles. These *aliptae* came to be recognised as a sort of medical trainers. A similar class of slaves attended their masters in the Roman baths, and they were also possessed of a certain kind of medical knowledge.

Discussing the origin of the operation of trepanning, Sprengel says that "nothing is more instructive, in the history of human knowledge, than to go back to the origin, or the clumsy rough sketch of the discoveries to which man was conducted by accident or reflection, and to follow the successive improvements which his methods and his instruments undergo."² The name of the inventor of this operation is lost in the night of time. Hippocrates gives us the first account of trepanning in his treatise on Wounds of the Head. We know, however, that it was performed long before his time. Dr. Handerson, the translator of *Baas' History of Medicine*, says that human skulls of the neolithic period have been discovered which bear evidences of trepanning.³

The operation of cutting for the stone, like many other of the most difficult operations of surgery, was for a long time given over to

¹ *Massage*, by W. E. Green, M.R.C.S. (*Prov. Med. Jour.*, May 2nd, 1892, p. 242).

² *Hist. de la M^éd.*, vol. vii. p. 1.

³ See also Surgeon Fletcher's report in the *U.S. Geographical and Geological Survey of the Rocky Mountain Region*, vol. v. 1882.

ignorant persons who make a speciality of it. Sprengel attributes this injurious custom to the ridiculous pride of the properly instructed doctors, who disdained to undertake operations which could be successfully performed by laymen.¹

The Bafiotés, on the coast of South Guinea, practise cupping. They make incisions in the skin, and place horns over the wounds, and then suck out the air, withdrawing the blood by these means.²

"Felkin saw a case of the Cæsarean operation in Central Africa performed by a man. At one stroke an incision was made through both the abdominal walls and the uterus; the opening in the latter organ was then enlarged, the hæmorrhage checked by the actual cautery, and the child removed. While an assistant compressed the abdomen, the operator then removed the placenta. The bleeding from the abdominal walls was then checked. No sutures were placed in the walls of the uterus, but the abdominal parietes were fastened together by seven figure-of-eight sutures, formed with polished iron needles and threads of bark. The wound was then dressed with a paste prepared from various roots, the woman placed quietly upon her abdomen, in order to favour perfect drainage, and the task of this African Spencer Wells was finished. It appears that the patient was first rendered half unconscious by banana wine. One hour after the operation the patient was doing well, and her temperature never rose above 101° F., nor her pulse above 108. On the eleventh day the wound was completely healed, and the woman apparently as well as usual."³

The South Sea Islanders perform trepanning, and some Australian tribes perform ovariectomy.⁴

The missionary d'Entrecolles was the first to inform the Western world of the method of inoculation for the small-pox, which the Chinese have followed for many centuries.⁵

In many countries, and from the earliest times, says Sprengel,⁶ it has been customary to inoculate children with small-pox, because experience has shown that a disease thus provoked assumes a milder and more benign form than the disease which comes naturally.

¹ *Hist. de la Méd.*, tome vii. p. 208.

² Baas, *Hist. Méd.*, p. 70.

³ *Ibid.*

⁴ *Ibid.*, p. 76.

⁵ *Lettres édifiantes et curieuses*, tom. xxi. p. 5. Hottentots and negroes in Central Africa, according to Livingstone, have from remote times practised inoculation in a similar manner.

⁶ *Hist. de la Méd.*, vol. vii. p. 34.

CHAPTER VII.

UNIVERSALITY OF THE USE OF INTOXICANTS.

Egyptian Beer and Brandy.—Mexican Pulque.—Plant-worship.—Union with the Godhead by Alcohol.—Soma.—The Cow-religion.—Caxiri.—Murwa Beer.—Bacchic Rites.—Spiritual Exaltation by Wine.

ONE of the strongest desires of human nature is the passion for some kind or another of alcoholic stimulants. Intoxicating liquors are made by savages in primeval forests, and travellers in all parts of the world have found the natives conversant with the art of preparing some sort of stimulating liquor in the shape of beer, wine, or spirit. The ancient Egyptians had their beer and brandy, the Mexicans their aloe beer or pulque. Probably the art of preparing fermented drinks was in each nation discovered by accident. Berries soaked in water, set aside and forgotten, saccharine roots steeped in water and juices preserved for future use, have probably taught primitive man everywhere to manufacture stimulating beverages. The influence of alcoholic drinks on the development of the human mind must have been very great. If primitive man has learned so much from his dreams, what has he not learned from the exaltation produced by medicinal plants and alcoholic infusions? If the savage conceives the leaves of a tree waving in the breeze to be influenced by a spirit, it is certain that a medicinal plant or a fermented liquor would be believed to be possessed by a beneficent or evil principle or being. A poison would be possessed by a demon, a healing plant by a good spirit, a stimulating liquor by a god. Plant-worship would on these principles be found amongst the earliest religious practices of mankind, and so we find it, although not to the extent we might have expected.

Some savage peoples worship plants and make offerings to the spirits which dwell in certain trees. It would seem that it is not the plant or tree itself which is thus venerated, but the ghost which makes it its dwelling. In classic times "the ivy was sacred to Osiris and Bacchus, the pine to Neptune, herb mercury to Hermes, black hellebore to Melampus, centaury to Chiron, the laurel to Aloeus, the hyacinth to Ajax, the squill to Epimenides," etc.¹

¹ Pettigrew's *Medical Superstition*, p. 24.

Herbert Spencer thinks that plant-worship arose from the connection between plants and the intoxication which they produce. It is very remarkable that almost all peoples of whom we have any knowledge produce from the maceration of various vegetable substances some kind of intoxicating liquor, beer, wine, or spirit. As the excitement produced by fainting, fever, hysteria, or insanity is ascribed amongst savages and half-civilized peoples to a possessing spirit, so also is any exaltation of the mind, by whatever means produced, attributed to a similar cause. Supernatural beings they consider may be swallowed in food or drink, especially the latter.¹

Vambery speaks of opium-eaters who intoxicated themselves with the drug, that they might be nearer the beings they loved so well. The Mandingoes think that intoxication brings them into relation with the godhead. A Papuan Islander hearing about the Christian God said, "Then this God is certainly in your arrack, for I never feel happier than when I have drunk plenty of it."²

Any one who reads the sacred books of the East for the first time, especially the Vedic hymns, will be puzzled to say whether the *Soma*, which is referred to so often, is a deity or something to drink. If we turn up the word in the index volume of the *Encyclopædia Britannica*, we are astonished to find such an entry as this: "Soma, a drink, in Brahminical ritual, iv. 205; as a deity, iv. 205; vii. 249." The soma, speaking scientifically, is an intoxicating liquor prepared from the juice of a kind of milk-weed, *Asclepias acida*, sometimes called the moon-plant. In the *Rig-Veda* and the *Zend Avesta* (where it is called *Haoma*) it appears as a mighty god endowed with the most wonderful exhilarating properties. Herbert Spencer, in the chapter of the *Sociology* entitled "Plant-Worship," gives some of the expressions used in the *Rig-Veda* concerning this fermented soma-juice.

"This [Soma] when drunk, stimulates my speech [or hymn]; this called forth the ardent thought." (R.V. vi. 47, 3.)

"The ruddy Soma, generating hymns, with the powers of a poet." (R.V. ix. 25, 5.)

"We have drunk the Soma, we have become immortal, we have entered into light, we have known the gods," etc. (R.V. viii. 48, 3.)

"The former [priests] having strewed the sacred grass, offered up a hymn to thee, O Soma, for great strength and food." (R.V. lx. 110, 7.)

"For through thee, O pure Soma, our wise forefathers of old performed their sacred rites." (R.V. ix. 96, 11.)

"Soma—do thou enter into us," etc.

Dr. Muir calls Soma "the Indian Dionysus."

¹ *Principles of Sociology*, Herbert Spencer, vol. i. p. 374.

² *Ibid.*

In Peru tobacco "has been called the sacred herb."

Markham says, "The Peruvians still look upon coca with feelings of superstitious veneration." In the time of the Incas it was sacrificed to the sun. In North Mexico, Bancroft says that some of the natives "have a great veneration for the hidden virtues of poisonous plants, and believe that if they crush or destroy one, some harm will happen to them." "And at the present time," says Mr. Spencer, "in the Philippine Islands, the ignatius bean, which contains strychnia and is used as a medicine, is worn as an amulet and held capable of miracles." The Babylonians seem to have held the palm-tree as sacred, doubtless because fermented palm-juice makes an intoxicating drink.

The Palal, the supreme pontiff of the cow-religion of the Toda people of the Neilgherries, is initiated with incantations, and the smearing of his body with the juice of a sacred shrub called the tude.¹

He also drinks some of the extract mixed with water. He is purified by soaking himself with the juice of this plant, and in a week has become a god; he is the supreme being of the Todas. This transmutation is suggestive of the sacred soma.²

The aborigines of the Amazon make an intoxicating drink from wild fruits, which they use at their dances and festivals.³ The people on the Rio Negro use a liquor called "xirac" for the same purpose. The Brazilian Indians have their "caxiri," which is the same thing; it is a beer made from mandiocca cakes. This mandiocca is chewed by the old women, spat into a pan, and soaked in water till it ferments. The Marghi people of North Africa have an intoxicating liquor called "Komil," made of Guinea-corn, which Barth said tastes like bad beer, and is very confusing to the brain.⁴

The Apaches make an intoxicating liquor from cactus juice, or with boiled and fermented corn. Their drunkenness is a preparation for religious acts.⁵

The Kolarians of Bengal believe that the flowers of the maowah tree (*Bassia latifolia*) will cure almost every kind of sickness. "Not a cot," says Reclus,⁶ "but distils a heady liquor from the petals; not a Khond man who does not get royally drunk."

The people of the Nepal Himalayas make a beer from half-fermented millet, which they call *Murwa*; it is weak, but very refreshing. Hooker says the millet-seed is moistened, and ferments for two days; it is then put into a vessel of wicker-work, lined with india-rubber gum to make

¹ *Meliosma simplicifolia*, or *Millingtonia*.

² Reclus, *Primitive Folk*, p. 222.

³ Wallace, *Travels on the Amazon*, chap. xvii.

⁴ Barth, *Travels in Africa*, Ed. 1890, p. 416.

⁵ Reclus, *Primitive Folk*, p. 136.

⁶ *Ibid.*, p. 251.

it water tight; and boiling water is poured in it with a ladle of gourd, from a cauldron that stands all day over the fire. The fluid, when fresh, tasted like negus.¹

The fermented juice of the cocoa-nut palm makes an intoxicating toddy, of which some birds in the forests round Bombay are as fond as are the natives themselves.²

The natives of Tahiti made an intoxicating drink by chewing the fresh root of the "ava," a plant of the pepper tribe (*Piper methysticum*), long before Europeans taught them to ferment the fruits of the country about the year 1796. The chewed root was rinsed in water, and by fermentation a drowsy form of intoxicating liquor was produced of which the natives were extremely fond. They now prefer gin and brandy. The effects of ava or kava intoxication are said to be somewhat similar to those of opium. The Nukahivans drink kava as a remedy for phthisis; it would seem to be of real value in bronchitis, as a chemical examination of the root shows it to contain an oleo-resin probably somewhat akin to balsam of Peru or tolu. It is an ally of the matico, and in its nature and operation closely resembles cubeb and copaiba, which are used to produce a constriction of the capillary vessels.

Cascarilla bark and other barks of the various species of croton, of the Bahama and West India Islands, have valuable stimulant properties universally recognised in modern medicine. They are used in the treatment of dyspepsia and as a mild tonic.

The Carib races were fully conversant with the valuable properties of these drugs; the native priests or doctors used the dried plants for fumigations and in religious ceremonies; and curiously enough at the present day cascarilla bark is one of the ingredients of incense. An infusion of the leaves was used internally in Carib medicine, and the dried bark was mixed with tobacco and smoked, as is often done in civilized lands.

Anacreontic poetry and Bacchic rites were merely intellectual developments of sentiments which the savage feels and expresses in a coarse animal way, just as the alderman's sense of gratification and perfect contentment after a civic banquet is not altogether different in kind from that felt by a replete quadruped.

Alcoholic intoxication must have produced in primitive man visions far surpassing those of his pleasantest dreams, and his brain must have been filled with images, sometimes pleasant, sometimes horrible, of a more pronounced character than those which visited him in sleep. At such times would come some of the visitants from the world of imagination to the mind of primitive man which have had the most

¹ Hooker, *Himalayan Journals*, Ed. 1891, p. 204.

² Blavatsky, *Caves and Jungles of Hindostan*, p. 13.

important influence on his intellectual development. The drinking customs of our working classes of the present day are in a great degree prompted by the longing which man in every condition has to escape for a while from the squalid, material surroundings of daily life into the ideal world of intellectual pleasures, however low these may often be. "A national love for strong drink," says a competent authority,¹ "is a characteristic of the nobler and more energetic populations of the world; it accompanies public and private enterprise, constancy of purpose, liberality of thought, and aptitude for war." Tea, haschish, hops, alcohol, and tobacco stimulate in small doses and narcotise in larger; there have been cases known of tea intoxication.²

The desire of escaping from self into an ideal world, a world of novelty and pleasures unimaginable, had much to do with the festivals in Greece in honour of Dionysus; it was in some places considered a crime to remain sober at the Dionysia; to be intoxicated on such occasions was to show one's gratitude for the gift of wine.

¹ Quoted in the article on "Drunkenness" in *Ency. Brit.*

² See *Third Annual Report of the Massachusetts Board of Health.*

CHAPTER VIII.

CUSTOMS CONNECTED WITH PREGNANCY AND CHILD-BEARING.

The Couvade, its Prevalence in Savage and Civilized Lands.—Pregnant Women excluded from Kitchens.—The Deities of the Lying-in Chamber.

DR. TYLOR¹ gives the following account of the Carib couvade in the West Indies from the work of Du Tertre :²—

“When a child is born, the mother goes presently to her work, but the father begins to complain, and takes to his hammock, and there he is visited as though he were sick, and undergoes a course of dieting which would cure of the gout the most replete of Frenchmen. How they can fast so much and not die of it,” continues the narrator, “is amazing to me, for they sometimes pass the five first days without eating or drinking anything, then up to the tenth they drink *ouïcou*, which has about as much nourishment in it as beer. These ten days passed, they begin to eat cassava only, drinking *ouïcou*, and abstaining from everything else for the space of a whole month. During this time, however, they only eat the inside of the cassava, so that what is left is like the rim of a hat when the block has been taken out, and all the cassava rims they keep for the feast at the end of forty days, hanging them up in the house with the cord. When the forty days are up they invite their relations and best friends, who being arrived, before they set to eating, hack the skin of this poor wretch with agouti-teeth, and draw blood from all parts of his body in such sort that from being sick by pure imagination they often make a real patient of him. This is, however, so to speak, only the fish, for now comes the sauce they prepare for him ; they take sixty or eighty large grains of pimento or Indian pepper, the strongest they can get, and after well washing it in water they wash with this peppery infusion the wounds and scars of the poor fellow, who I believe suffers no less than if he were burnt alive ; however, he must not utter a single word if he will not pass for a coward and a wretch. This ceremony finished, they bring him back to his bed, where he remains some days more, and the rest go and

¹ *Early Hist. Mankind*, p. 288.

² *Hist. Gén. des Antilles habitées par les Français* : Paris, 1667, vol. ii. p. 371, etc.

make good cheer in the house at his expense. Nor is this all; for through the space of six whole months he eats neither birds nor fish, firmly believing that this would injure the child's stomach, and that it would participate in the natural faults of the animals on which its father had fed; for example, if the father ate turtle, the child would be deaf and have no brains like this animal, if he ate manati, the child would have little round eyes like this creature, and so on with the rest. It seems that this very severe fasting is only for the first child, that for the others being slight."

Among the Arawaks of Surinam a father must kill no large game for some time after his child is born. When a wife has borne a child, amongst the Abipones, the husband is put to bed and well wrapped up and kept as though he had had the child. Among the Land Dayaks of Borneo, after the birth of his child the father is kept in seclusion indoors for several days and dieted on rice and salt to prevent the child's stomach from swelling. All this is due to a belief in a bodily union between father and child; different persons with these savages are not necessarily separate beings.

Tylor says¹ that Venegas mentions the couvade among the Indians of California; Zuccheli in West Africa; Captain Van der Hart in Bouro, in the Eastern Archipelago; and Marco Polo in Eastern Asia in the thirteenth century. In Europe even in modern times it existed in the neighbourhood of the Pyrenees. Strabo said,² that among the Iberians of the North of Spain, the women, after the birth of a child, tend their husbands, putting them to bed instead of going themselves. Among the Basques, says Michel, "in valleys whose population recalls in its usages the infancy of society, the women rise immediately after child-birth and attend to the duties of the household, while the husband goes to bed, taking the baby with him, and thus receives the neighbours' compliments." Diodorus Siculus mentions the same thing of the Corsicans (v. 14). Hudibras says,³—

"For though Chineses go to bed
And lie in, in their ladies' stead,
And, for the pains they took before,
Are nurs'd and pamper'd to do more."

On this remarks Dr. Zachary Grey⁴ :—

"The Chinese men of quality, when their wives are brought to bed, are nursed and tended with as much care as women here, and are supplied with the best strengthening and nourishing diet in order to qualify them for future services." This is the custom of the Brazilians, if we

¹ *Early Hist. Mankind*, p. 294.

² iii. 4, 17.

³ Pt. iii., Canto i.

⁴ Notes to his edition of *Hudibras*, 1744, loc. cit.

may believe Masseus, who observes, "that women in travail are delivered without great difficulty, and presently go about their household business: the husband in her stead keepeth his bed, is visited by his neighbours, hath his broths made him, and junkets sent to comfort him."

"Among the Iroquois, a mother who shrieks during her labour is forbidden to bear other children, and some of the South American Indians killed the children of the mothers who shrieked, from the belief that they will grow up to be cowards."¹

The origin of the couvade is not to be traced to the father and mother, says Starcke; it has to do simply with the well-being of the child. The father's powers of endurance, tested so severely as we have seen, are believed to be assured to the child.²

Max Müller traces the origin of the couvade to the derision of friends of both sexes.

Dobrizhoffer says of the Abipones: ³ "They comply with this custom with the greater care and readiness because they believe that the father's rest and abstinence have an extraordinary effect on the well-being of new-born infants, and is, indeed, absolutely necessary for them. For they are quite convinced that any unseemly act on the father's part would injuriously affect the child on account of the sympathetic tie which naturally subsists between them, so that in the event of the child's death the women all blame the self-indulgence of the father, and find fault with this or that act."

Badaga nursing-women physic themselves with ashes and pieces of sweet-flag (*Acorus calamus*), an aromatic plant, with the idea of communicating medicinal properties to the milk. They also administer to the baby assafoetida and a certain sacred confection taken from the entrails of a bull and similar to the bezoar stones so celebrated in the middle ages.⁴

The Badaga folk do not permit a pregnant woman to enter the room where the provisions are kept and the fireplace stands; it would be feared that her condition, her supposed uncleanness, might lessen the virtues of the fire or diminish the nutritious value of the food.⁵

Pliny says, "there is no limit to the marvellous powers attributed to females."⁶ At certain times, according to him, a woman can scare away hailstorms, whirlwinds, and lightnings, by going about in scanty costume. If she walk round a field of wheat at such times, the caterpillars, worms, beetles, and other vermin will fall from the ears of corn.

¹ Starcke, *The Primitive Family*, p. 52.

⁴ Reclus, *Primitive Folk*, p. 202.

⁶ *Natural History*, Book xxviii., ch. 23.

² *Ibid.* ³ Vol. ii. p. 275.

⁵ *Ibid.*, p. 192.

If she touch "young vines, they are irremediably injured, and both rue and ivy, plants possessed of highly medicinal virtues, will 'die instantly upon being touched by her." Bees, he says, will forsake their hives if she touches them, linen boiling in a cauldron will turn black, and the edge of a razor will become blunted. The bitumen that is found in Judæa will yield to nothing but this, and Tacitus says the same thing. Marvellous to say, poisonous and injurious as Pliny and other writers, and even popular belief at the present day, consider the catamenial fluid to be, a host of writers on medical and magical subjects have attributed certain remedial properties to it. Pliny says it is useful, as a topical application, for gout, the bite of a mad dog (what has *not* been recommended for this !), for tertian or quartan fevers and for epilepsy. Reduced to ashes and mixed with soot and wax, it is a cure for ulcers upon all kinds of beasts of burden ; mixed in the same way with oil of roses and applied to the forehead, it cured the migraine of Roman ladies. Applied to the doorposts, it neutralises all the spells of the magicians—a set of men which even the credulous Pliny characterizes as the most lying in existence.

Both savages and classical peoples had the same curious notions about the touch of catamenial women. There may possibly be some foundation in bacteriology to account for them.

St. Augustine says :¹ "The woman in child-bed must have three gods to look to her after her deliverance, lest Sylvanus come in the night and torment her : in signification whereof, three men must go about the house in the night, and first strike the thresholds with an hatchet, then with a pestle, and then sweep them with besoms, that by these signs of worship they may keep Sylvanus out."

Lying-in women in Germany in the seventeenth century were simply crammed with food about every two hours, and they seem to have taken no harm from the practice.

¹ *De Civ.*, Lib. vi. 9.

BOOK II.

THE MEDICINE OF THE ANCIENT CIVILIZATIONS.

CHAPTER I.

EGYPTIAN MEDICINE.

Antiquity of Egyptian Civilization.—Surgical Bandaging.—Gods and Goddesses of Medicine.—Medical Specialists.—Egyptians claimed to have discovered the Healing Art.—Medicine largely Theurgic.—Magic and Sorcery forbidden to the Laity.—The Embalmers.—Anatomy.—Therapeutics.—Plants in use in Ancient Egypt.—Surgery and Chemistry.—Disease-demons.—Medical Papyri.—Great Skill of Egyptian Physicians.

So far as we are able to judge from the records of the past which recent investigations have made familiar to us, the civilization of Egypt is the most ancient of which we have accurate knowledge. The contending claims of India to a higher antiquity for its civilization cannot here be discussed, and for the purposes of this work the oldest place in the civilization of the world must be assigned to Egypt.

It is highly probable that the first kingdom of Egypt existed eight thousand years back. The history of Egypt as we have it in her monuments and records is far more trustworthy than the stories which the Chinese and other ancient peoples tell of their past. Assyria, Babylonia, and Chaldæa have histories reaching back to the twilight of the ages ; but for practical purposes we must content ourselves with tracing the rise and progress of civilization as we decipher it on the banks of the Nile. So far as medicine and chemistry are concerned, we shall discover abundant matter to interest us. We require no other proof than the mummies in our museums to convince us that the Egyptians from the period at which those interesting objects date must have possessed a very accurate knowledge of anatomy, of pharmacy, and a skill in surgical bandaging very far surpassing that possessed now-a-days by even the most skilful professors of the art. Dr. Granville says : "There is not a single form of bandage known to modern surgery, of which far better and cleverer examples are not seen in the swathings of the Egyptian mummies. The strips of linen are found without one single joint, extending to 1000 yards in length." It is said that there is not a fracture known to modern surgery which could not have been successfully treated by the priest-physicians of ancient Egypt. The great

divinities of Egypt were Isis and Osiris ; the former was the goddess of procreation and birth. As it was she who decreed life and death, and decided the fate of men, it is not surprising to find her the chief of the divinities of the healing art ; she had proved her claims as the great chief of physicians by recalling to life her son Horus.

The Æsculapius of the Egyptians was Imhotep ; he was the god of the sciences, and was the son of Ptah and Pakht. The gods of Egypt were worshipped in triads or trinities, and many of the great temples were devoted to the worship of one or other of these trinities, that of Memphis consisted of Ptah, Pakht, and Imhotep. Thoth or Tauut was similar to Imhotep ; he was the god of letters, and, as the deity of wisdom, he aids Horus against Set, the representative of physical evil. By many writers he is considered to be the Egyptian Æsculapius. He has some evident relationship to the Greek Hermes. "Thoth," says Dr. Baas (*Hist. Med.*, p. 14), "is supposed to have been the author of the oldest Egyptian medical works, whose contents were first engraved upon pillars of stone. Subsequently collected into the book *Ambre* or *Embre* (a title based upon the initial words of this book, viz. 'Ha em re em per em hrū,' i.e. 'Here begins the book of the preparation of drugs for all parts of the human body'), they formed a part of the so-called 'Hermetic Books,' from whose prescriptions no physician might deviate, unless he was willing to expose himself to punishment in case the patient died. This punishment was threatened because the substance of the medical, as well as the religious works of the Egyptians—and the science of the priests united in itself medicine, theology, and philosophy—was given, according to their view, by the gods themselves, and a disregard of their prescriptions would be nothing less than sacrilege." The Hermetic books, says Clement of Alexandria, were forty-two in number, of which six "of the pastophor" were medical. The famous *Book of the Dead* is supposed by Bunsen to have been one of the Hermetic books. The papyrus of Ebers, believed by that Egyptologist to date from the year 1500 B.C., is considered to have been one of the number of the medical books of Hermes Trismegistus. The Papyrus Ebers is preserved in Leipsic, and, though at present only partially deciphered, abundantly shows the great advance already made at so distant a period as the fourth millennium before the Christian era in the arts of medicine and surgery.

One of the authors mentioned in the papyrus is an oculist of Byblos in Phœnicia. This proves not only that there were specialists in diseases of the eye at that period, but that neighbouring nations contributed of their store of scientific knowledge to enrich that of the Egyptians.

Dr. Baas informs us that this papyrus describes "remedies for diseases of the stomach, the abdomen, and the urinary bladder; for the cure of swellings of the glands in the groin (buboes) and the 'kehrn-mite'; 'the Book of the Eyes'; remedies for ulcers of the head, for greyness of the hair, and promotion of its growth; ointments to heal and strengthen the nerves; medicines to cure diseases of the tongue, to strengthen the teeth, to remove lice and fleas; remedies for the hearing and for the organs of smell; the preparation of the famous Kyphi; 'The Secret Book of the Physician' (the science of the movement of the heart, and the knowledge of the heart, according to the priestly physician Nebsuchet); prescriptions for the eyes according to the views of the priest Chui, a Semite of Byblos; 'Book of the Banishing of Pains,' recipes for mouth-pills for women, to render the odour of the mouth agreeable; the various uses of the tequem tree, etc. The papyrus has marginal notes, like *nefer* (good), etc., which Lauth assigns to the year B.C. 1469—an evidence that its prescriptions had been tested in practice."¹

Osiris (who would appear to be the same deity as Apis or Serapis) and the goddess Isis, who was his wife and sister, were held by the Egyptians to have been the inventors of the medical arts. A very ancient inscription on a column says: "My father is Chronos, the youngest of all the gods. I am the king Osiris, who has been through all the earth; even to the habitable lands of the Indies, to those which are under the Bear, even to the sources of the Danube, and besides to the Ocean. I am the eldest son of Chronos, and the scion of a beautiful and noble race; I am the parent of the day, there is no part of the world where I have not been, and I have filled all the world with my benefactions." Another column has these words: "I am Isis, queen of all this country, who has been instructed by Thoth; no one is able to unbind what I have bound; I am the eldest daughter of Chronos, the youngest of the gods. I am the wife and the sister of King Osiris. It is I who first taught mankind the art of agriculture. I am the mother of King Horus. It is I who shine in the dog-star. It is I who built the city of Bubastis. Farewell, farewell, Egypt, where I have been reared." It appears from these inscriptions that Isis and Osiris were contemporary with Thoth or Hermes.

Diodorus says that Isis was believed by the Egyptian priests to have invented various medicines and to have been an expert practitioner of the healing art, and that she was on this account raised to the ranks of the gods, where she still takes interest in the health of mankind. She was supposed to indicate appropriate remedies for diseases in dreams,

¹ *Hist. Med., Eng. Trans., p. 16.*

and such remedies were always efficacious, even in cases where physicians had failed to do any good.

The inscription informs us that Osiris had filled the earth with his benefactions. The Egyptian priests believed that Thoth was the inventor of the arts and sciences in general, and the king Osiris and the queen Isis invented those which were necessary to life. Isis therefore invented agriculture, and Osiris is credited with having invented medicine. Apis, who is evidently the same person as Osiris, is said by Clement of Alexandria to have discovered medicine before he went to Egypt.

Cyrl of Alexandria says that Apis was the first to invent the art of medicine, or who exercised it with more success than his predecessors, having been instructed by Æsculapius.¹

Plutarch says ² that Apis and Osiris were, according to Egyptian traditions, two names of one and the same person, and this is confirmed by Strabo and Theodoret. Others say that Serapis was a third name of Osiris, though some consider that Serapis was a name of Æsculapius.

Horus, the son of Isis and Osiris, was the Egyptian sun-god, and was the same as the Apollo of the Greeks. He was born with his finger on his mouth, indicative of mystery and secrecy; and so, probably, was for this reason connected with medicine. In the mystical works of Hermes Trismegistus, he plays an important part. Diodorus attributes to Horus the invention of medicine. He says that Isis having found in the water her son Horus, who had been killed by the Titans, restored him to life and made him immortal. Diodorus adds that he was the same god as Apollo, and that he learned the arts of medicine and divination from his mother, in consequence of which instruction he had been of great service to mankind by his oracles and his remedies. It is difficult to see how on this account Horus can be considered as the inventor of medicine, a title which was surely due to his mother.

In the judgment scene in the Book of the Dead on the papyrus of Ani we have the god Thoth, under the symbol of the cynocephalus, or dog-headed ape. Anubis examines the indicator of the Balance. Before Anubis stands Destiny, behind him are Fortune and the Goddess of Birth. Above Destiny is a symbol of the cradle. The human-headed bird is the soul of the deceased. On the right of the scene, Thoth, the medicine-god and scribe of the gods (with the head of an ibis), notes the result of the trial. Behind Thoth is the moon-god Amemit, the devourer, with the head of a crocodile, the middle part of a lion, and the hind-quarters of a hippopotamus. Thoth pronounces judgment: "The heart of Ani is weighed, and his soul standeth in

¹ Le Clerc, *Hist. de la Médecine*.

² Lib. de Iside et Osiride.



EXPELLING THE DISEASE-DEMON.

[Signature]

evidence thereof; his case is straight upon the great Balance." The gods reply, "Righteous and just is Osiris, Ani, the triumphant."¹

Eusebius, Psellus, and others say that Hermes Trismegistus was a priest and philosopher who lived a little after the time of Moses. He taught the Egyptians mathematics, theology, medicine, and geography. Of the forty-two most useful books of Hermes six treated of medicine, anatomy, and the cure of disease.²

Pliny says³ that the Egyptians claimed the honour of having invented the art of curing diseases. Wilkinson points out⁴ that "the study of medicine and surgery appears to have commenced at a very early period in Egypt, since Athothes, the second king of the country, is stated to have written upon the subject of anatomy, and the schools of Alexandria⁵ continued till a late period to enjoy the reputation and display the skill they had inherited from their predecessors. Hermes was said to have written six books on medicine, the first of which related to anatomy; and the various recipes known to have been beneficial were recorded, with their peculiar cases, in the memoirs of physic, inscribed among the laws, which were deposited in the principal temple of the place, as at Memphis in that of Ptah, or Vulcan." We are told in Genesis i. 2 that "Joseph commanded his servants the physicians to embalm his father: and the physicians embalmed Israel." It is not probable that the embalmers were regular practising physicians. The dissectors of the human body were not held in honour amongst the Egyptians, and for sanitary reasons it is highly improbable that doctors in attendance upon the sick would have engaged in this work; but as the art of embalming demanded considerable anatomical knowledge, it is more likely that a class of men similar to our dissecting-room assistants at the medical schools and hospitals were employed for this purpose.

The art of medicine in ancient Egypt consisted of two branches—the higher, which was the theurgic part, and the lower, which was the art of the physician proper. The theurgic class devoted themselves to magic, counteracting charms by prayers, and to the interpretation of the dreams of the sick who had sought their aid in the temples. The inferior class were practitioners who simply used natural means in their profession as healers. Amongst the Egyptian Platonists, theurgy was an imaginary science, which is thus described by Murdock: "it was supposed to have

¹ *Official Guide Brit. Mus.*, "Egyptian Antiquities," pp. 107-8.

² *Clem. Alex., Strom.*, lib. vi. p. 196.

³ vii. 56.

⁴ *Ancient Egyptians*, vol. ii. p. 358.

⁵ *Ammianus Marcellinus*, i. 16, says, for a doctor to recommend his skill, it was sufficient to say that he had studied at Alexandria.

been revealed to men by the gods themselves in very ancient times, and to have been handed down by the priests ; [it was] also the ability, by means of certain acts, words, and symbols, to move the gods to impart secrets which surpass the powers of reason to lay open the future." The higher physicians were priest-magicians, the lower class were priests who were called Pastophori ; as Isis and the priests were connected with the healing art, the Pastophori were highly esteemed for their medical skill apart from magic. These officials were so called from the fact that they had to bear, in the ceremonies in the temples, the *παστός*, or sacred shawl, to raise it at appropriate times, and so discover the god in the adytum.¹

It was their duty to study the last six of the Hermetic books, as it was that of the higher grade to study the first thirty-six.

Professor Ebers explained to Dr. Puschmann² that the Pastophori "constituted a class of priests who held by no means so low a rank as is attributed to them in historical works. The doctors were bound to maintain a spiritual character, and allowed themselves therefore to rank with the Pastophori, although the higher priestly dignities probably remained open to them. On the other hand, the Pastophori were by no means likewise doctors, as many think, but had as a body quite other functions, as their name indeed indicates. The relation of the Pastophori to the doctors was doubtless the same as that of the scholar to the cleric in the Christian middle ages ; all scholars did not belong to the clergy, but at the same time all clergymen might be considered scholars."

The principle of authority was paramount in Egyptian medicine. So long as the doctor faithfully followed the instructions of the ancient exponents of his art, he could do as he liked with his patient ; but if he struck out a path for himself, and his patient unhappily died, he forfeited his own life. Diodorus Siculus leads us to suppose that the physicians formed their diagnosis according to the position occupied by the patient in his bed. This is singularly like the method of diagnosing diseases in use amongst the ancient Hindus. Medicine in Egypt, after all, was only an art ; the absurd reverence for authority prevented any real progress. Kept back by these fixed regulations, its freedom was restricted on every side ; otherwise, with the unbounded facility for making post-mortem examinations, Egyptian medicine would have made immense advance.

Concerning the specialism which prevailed amongst Egyptian doctors, Herodotus says : "The art of medicine is thus divided amongst them ; each physician applies himself to one disease only, and not more. All places abound in physicians ; some physicians are for the eyes, others

¹ Clem. Alex., *Strom.*

² *Hist. Med. Education*, p. 24.

for the head, others for the teeth, others for the parts about the belly, and others for internal disorders." ¹

With reference to the teeth, it is interesting to observe that some of the dental work found in opening mummies is equal to our own.

Sir J. Wilkinson says ² that the embalmers were probably members of the medical profession as well as of the class of priests. Pliny states that, during this process, certain examinations took place, which enabled them to study the disease of which the patient had died. They appear to have been made in compliance with an order from the government, ³ as he says the kings of Egypt had the bodies opened after death to ascertain the nature of their diseases, by which means alone the remedy for phthisical complaints was discovered. Indeed, it is reasonable to suppose that a people so advanced as were the Egyptians in knowledge of all kinds, and whose medical art was so systematically arranged that they had regulated it by some of the very same laws followed by the most enlightened and skilful nations of the present day, would not have omitted so useful an inquiry, or have failed to avail themselves of the means which the process adopted for embalming the body placed at their disposal. And nothing can more clearly prove their advancement in the study of human diseases than the fact of their assigning to each his own peculiar branch, under the different heads of oculists, dentists, those who cured diseases in the head, those who confined themselves to intestinal complaints, and those who attended to secret and internal maladies. They must have possessed an intimate knowledge of drugs, to have enabled them to select those of an antiseptic character suitable for the preservation of the mummies. That their practical knowledge of anatomy must have been considerable is proved by the skill with which they removed the more perishable parts of the body in the process of embalming. The embalmers, says Ebers, were all enrolled in a guild which existed down to Roman times, as is shown in various Greek papyri.

In the wall-cases 30-33 in the upper floor of the second Egyptian room of the British Museum, there is a set of Canopic jars which held the intestines of the human body, which were always embalmed separately. They were placed near the bier and were four in number, each one being dedicated to one of the four children of Horus, the genii of the dead. The stomach and large intestines were dedicated to Amset, the smaller intestines to Hâpi, the lungs and heart to Tuamâvtef, and the liver and gall-bladder to Kebhsenuf. Poor people had to be content with mere models of these vases. ⁴

¹ Book ii. 84.

² Plin. xix. 5.

³ *Ancient Egyptians*, vol. iii. p. 477.

⁴ *Official Guide*, p. III.

The dissectors were the *paraschistes*, who cut open as much of the body as the law permitted with an Ethiopian stone. As soon as one of them had made the requisite incision he had to fly, pursued by those present, who cursed him bitterly, and flung stones at him. It was considered hateful to inflict any wound on a human body; and however necessary the act might be, the agent incurred the greatest odium.

The Egyptian doctors knew very little of anatomy as a science; they were, however, acquainted with the fact that the blood-vessels had their origin from the heart, and that the blood was distributed to the body from that organ. There is an interesting treatise on the heart in the Papyrus Ebers. In another medical papyrus we find the following anatomical details concerning the blood-vessels:—

“The head of man has thirty-two vessels; they carry the breath to his heart; they give inspiration to all his members. There are two vessels to the breasts; they give warmth to the lungs—for healing them, one must make a remedy of flour of fresh wheat, herb haka, and sycamore *teput*—make a decoction and let the patient drink it; she will be well. There are two vessels to the legs. If any one has a disease of the legs, if his arms are without strength, it is because the secret vessel of the leg has taken the malady,—a remedy must be made. . . . There are two vessels to the arms; if a man's arm is suffering, if he has pains in his fingers, say that this is a case of shooting pains. . . . There are two vessels of the occiput, two of the sinciput, two of the interior, two of the eyelids, two of the nostrils, and two of the left ear. The breath of life enters by them. There are two vessels of the right ear; the breath enters by them.”

It is uncertain whether by the term vessels the Egyptians understand the arteries, the veins, the nerves, or some imaginary conduits.¹

The ancient Egyptians were zealous students of medicine; yet, as Dr. Ebers tells us, they also thought that the efficacy of the treatment was enhanced by magic formulæ. The prescriptions in the famous Ebers Papyrus are accompanied by forms of exorcism to be used at the same time; “and yet many portions of this work,” says Ebers, “give evidence of the advanced knowledge of its authors.”²

Origen says³ that the Egyptians believed there were thirty-six demons, or thirty-six gods of the air, who shared amongst them the body of man, which is divided into as many parts. He adds that the Egyptians knew the names of those demons, and believed that if they invoked the proper demon of the affected part they would be cured. Magic and sorcery were arts which were forbidden to the laity.

¹ Chabas, *Mélanges Égyptologiques*, p. 64. ² Ebers, *Egypt*, vol. ii. p. 62.

³ *Contra Celsum*, lib. 8.

Many magical rites and animistic customs connected with the Egyptian religion closely resemble those which prevail over the whole continent of Africa. The basis of the Egyptian religion is supposed by some authorities to be of a purely Nigritian character; on which has been superimposed certain elevated characteristics due to Asiatic settlers and conquerors. The worship of the negroes proper is simply fetishism combined with tree and animal worship and a strong belief in sorcery.

The great and peculiar feature of Egyptian magic lay in the fact that its formulæ were intended to assimilate to the gods those who sought protection from the evils of life. The incantation was not in the nature of a prayer. As M. Lenormant says:¹ "The virtue of the formulæ lay not in an invocation of the divine power, but in the fact of a man's proclaiming himself such or such a god; and when he, in pronouncing the incantation, called to his aid any one of the various members of the Egyptian Pantheon, it was as one of themselves that he had a right to the assistance of his companions." In the Harris Papyrus is a fragment of one of the magical tracts of the medicine-god Thoth, in which is an incantation for protection against crocodiles:—

"Do not be against me! I am Amen.
I am Anhur, the good guardian;
I am the great master of the sword.
Do not erect thyself! I am Month.
Do not try to surprise me! I am Set.
Do not raise thy two arms against me! I am Sothis.
Do not seize me! I am Sethu."²

Disease-demons recognised the power of the gods, and obeyed their commands. An inscription on a monument of the time of Ramses XII. tells how the Princess Bint-reshe, sister of Queen Noferu-ra, was cured in a serious illness by the image of the god Khonsu being sent to her after the "learned expert" Thut-emhib had failed to do her any good. When the god appeared at her bedside, she was cured on the spot; the evil spirit of the disease acknowledged the superior power of Khonsu, and came out of her after making an appropriate speech.³

In the records of a trial about a harem conspiracy in the reign of Ramses III., we learn that a house steward had used some improper enchantments. In some fragments of the Lee and Rollin Papyrus, we read: "Then he gave him a writing from the rolls of the books of Ramses III., the great god, his lord. Then there came upon him a divine magic, an enchantment for men. He reached [thereby?] to the side of the women's house, and into that other great and deep place.

¹ *Chaldean Magic*, p. 96.

² *Ibid.*, pp. 96, 97.

³ Brugsch, *Egypt under the Pharaohs*, vol. ii. p. 184.

He formed figures of wax, with the intention of having them carried in by the hand of the land-surveyor Adiroma, to alienate the mind of one of the girls, and to bewitch others. . . . Now, however, he was brought to trial on account of them, and there was found in them incitation to all kinds of wickedness, and all kinds of villainy which it was his intention to do. . . . He had made some magic writings to ward off ill-luck; he had made some gods of wax, and some human figures to paralyse the limbs of a man; and he had put these into the hand of Bokakamon without the sun-god Ra having permitted that he should accomplish this," etc.¹

The actual medicaments used in Egyptian medical practice were not considered effectual without combination with magical remedies. The prescription might contain nitre, or cedar chips, or deer horn, or it might be an ointment or application of some herbs; but it would not be efficacious without some charm to deal with the spiritual mischief of the case. In administering an emetic, for example, it was necessary to employ the following appeal to the evil spirit of the disorder: "Oh, demon, who art lodged in the stomach of M., son of N., thou whose father is called Head-Smiter, whose name is Death, whose name is cursed for ever," etc. It was not the natural remedy which called the supernatural to its aid; but in cultivated Egypt, this combination was due to the theurgic healer availing himself of natural remedies to assist his magic. Science was beginning to work for man's benefit, but could not yet afford to discard sentimental aids which, by calming the mind of the sufferer, assisted its beneficent work. The different parts of the human body were confided to the protection of a special divinity. A calendar of lucky and unlucky days was devised, by which it could be ascertained what was proper to be medically done, or left undone, at certain times. Barth, in his *Travels in Africa*, in the border region of the desert, tells of a native doctor who followed such a system. He used to treat his patients according to the days of the week on which they came: one day was a calomel day, another was devoted to magnesia, and a third to tartar emetic; and everybody requiring medicine had to take that appropriate to the day.

The Egyptians distinguished between black and white magic. The learned priests practised the curative acts of magic; but it was held to be a great crime to use black magic whereby to injure men or assist unlawful passions.

Homer sings the praises of the medicinal herbs of prolific Egypt, where Pæon imparts to all the Pharian race his healing arts;² and in

¹ *Hist. Egypt*, by Brugsch-Bey, vol. ii. p. 163-4.

² *Odyssey*, iv. 229-232.

Jeremiah,¹ the daughter of Egypt is told that "in vain" she shall "use many medicines," for she shall not be cured.

The ancient Egyptians depended greatly upon clysters in the treatment of many diseases besides those of the intestines. They were composed of a mixture of medicinal herbs, with milk, honey, sweet beer, salt, etc. The use of clysters by the Egyptians was remarked by Pliny and Diodorus Siculus, and the invention was attributed by the former to the ibis, who, with its long bill, performed the necessary operation.²

This absurd idea arose from a confusion between the hieroglyph for the ibis, and the god Thoth, the name of each having the same sign.³

A comparison of the prescriptions of the medical papyri with those of the ancient Greek physicians, especially Galen and Dioscorides, shows a considerable family likeness of the Greek system of therapeutics to that of the Egyptians. Chabas particularizes the following facts:—Honey was used in place of sugar in many recipes by Egyptians and Greeks. Wine was mixed with honey, and human milk was administered in the form of clysters by Egyptians and by Galen and Dioscorides. The use of barley drink, palm wine, nitre, or sal ammoniac, incense as an external application, blood mixed with wine, urine as a liniment, *Lapis memphites*, and several other drugs is prescribed for the same disorders and in the same manner in the land of the Pharaohs and in ancient Greece.

The famous "Ebers Papyrus" was purchased in 1874 by Dr. Ebers, at Thebes. "This papyrus contains one hundred and ten pages, each page consisting of about twenty-two lines of bold hieratic writing. It may be described as an Encyclopædia of Medicine, as known and practised by the Egyptians of the eighteenth dynasty; and it contains prescriptions for all kinds of diseases—some borrowed from Syrian medical lore, and some of such great antiquity that they are ascribed to the mythologic ages, when the gods yet reigned personally upon earth. Among others, we are given the recipe for an application whereby Osiris cured Ra of the headache."⁴ This is the oldest of all the medical papyri hitherto discovered. It comes down to us, says Dr. Ebers,⁵ from the eighteenth dynasty. The "Medical Papyrus" of Berlin is second in point of antiquity; and a Hieratic MS. in London, the third.⁶

In the Ebers Medical Papyrus is an example of old Egyptian

¹ Chap. xlv., v. 11.

² Pliny, *Nat. Hist.*, viii. 27.

³ Chabas, *loc. cit.*, p. 66.

⁴ *Pharaohs and Fellahs*, Amelia B. Edwards, p. 219.

⁵ *Uarda*, vol. i. p. 32.

⁶ *Ibid.*

diagnosis and therapeutics : "When thou findest any one, with a hardness in his *re-het* (pit of the stomach), and when after eating he feels a pressure in his intestines, his stomach (*het*) is swollen, and he feels bad in walking, like one who suffers from heat in his back ; then observe him when he lies stretched out, and if thou findest his intestines hot, and a hardness in his *re-het*, say to thyself, this is a disease of the liver. Then prepare for thyself a remedy, according to the secrets of the (botanical) science, from the plant *pa-che-test* and dates ; mix them, and give in water" (Ebers).¹

The famous medical papyrus roll in the Museum of Berlin is described by M. Chabas in the chapter on "The Medicine of the Ancient Egyptians," in his work entitled *Mélanges Égyptologiques*. From this papyrus we learn that plaisters, ointments, liniments, and friction were employed as external remedies. Many of the names of the herbs and medicaments employed cannot be translated, but are merely transcribed. We find a number of recipes for tumours of the breast, for pimples, for "dissipating divinely parts injured by bruises," for destroying the bites of vermin, for cuts (common salt the chief ingredient), etc. The prescriptions seem very simple and brief.

Magical invocations were frequently employed in the treatment of disease. Chabas thinks that one of the maladies so treated was intestinal inflammation, with a feeling of heaviness, and hardness, and a griping pain. He translates the diagnosis of such a malady : "His belly is heavy, the mouth of his heart (*os ventriculi*) is sick, his heart (his stomach) is burning, . . . his clothes are heavy upon him. Many clothes do not warm him ; he is thirsty at night ; the taste of his heart is perverted, like a man who has eaten sycamore figs ; his flesh is deadened as a man who finds himself sick ; if he goes to stool, his bowels refuse to act. Pronounce on his case that he has a nest of inflammation in his belly ; the taste of his heart is sick, . . . if he raises himself, he is as a man who is unable to walk." The text of the papyrus gives the remedies to be used in such a case. "Apply to him the means of curing inflammation by warmth ; also the means of destroying the inflammation in the belly." The diagnosis and treatment here described apply very well to what we term peritonitis ; but Dr. Baas suggests that gastric cancer may be indicated.

There is a medical papyrus in the Berlin Museum, which was discovered in the necropolis of Memphis, and which is described by Brugsch² as containing a quantity of recipes for the cure of many diseases, including some of the nature of leprosy. There is also what the

¹ Baas' *Hist. Med.* (Eng. Trans.), p. 19.

² *History of Egypt*, vol. i. p. 58.

great Egyptologists term "a simple, childish exposition of the construction and mechanism of the body. The writing explained the number and use of the numerous 'tubes.'" The origin of part of this work is traced to the time of the fifth king of the table of Abydos, though the composition of the whole work is of the period of Ramses II. The text says of the more ancient portion: "This is the beginning of the collection of recipes for curing leprosy. It was discovered in a very ancient papyrus, enclosed in a writing-case, under the feet (of a statue) of the god Anubis, in the town of Sochem, at the time of the reign of his majesty the defunct King Sapti. After his death, it was brought to the majesty of the defunct King Senta, on account of its wonderful value. And, behold, the book was placed again at the feet, and well secured by the scribe of the temple, and the great physician, the wise Noferhotep. And when this happened to the book at the going down of the sun, he consecrated a meat, and drink, and incense offering to Isis, the lady; to Hor, of Athribis; and the god Khonsoo-Thut, of Amkhit."

Human brains are prescribed for a disease of the eyes in the Ebers Papyrus. Pharmacy must have made considerable progress at the time this work was written, as it contains two prescriptions for pills—one made with honey for women, and one without it for men.

Chabas says that a severe discipline reigned in the schools of the ancient Egyptians, and that the eloquence of the master was frequently supplemented by the rod of his assistants. He gives in his translations of papyri one of the exhortations to a pupil.¹

"Oh, scribe,² give not thyself to idleness, or thou shalt be smartly chastised; abandon not thy heart to pleasure, or thou wilt let thy books slip out of thy hands; practise conversation; discuss with those who are wiser than thyself; do the works of an elevated man. Yes, when thou shalt be advanced in years, thou wilt find this to be profitable. A scribe, skilful in every kind of work, will become powerful. Neglect not thy books; do not take a dislike to them."

Sir J. Gardner Wilkinson, in his *Manners and Customs of the Egyptians*, gives a list of plants (from Pliny) which were known to the Egyptians and used in medicine or the arts. Ladanum (*Cistus ladaniferus*) was introduced into Egypt by the Ptolemies. Myrobalanum (*Moringa aptera*?) produced a fruit from which an ointment was made. Cypros (*Lawsonia spinosa et inermis*) was cooked in oil to make the ointment called cyprus; the leaves were used to dye the hair.

¹ *Mélanges Égyptologiques*, Paris, 1862, p. 117.

² Priests and physicians were educated in high schools, the highest degree in which was that of the "scribes," who were maintained at the cost of the king. Ebers, *Uarda*, vol. i. p. 20.

Elate (Abies?), palma or spathe was of use in ointments. Oil of bitter almonds. Olives and figs were much esteemed. The castor-oil plant (*Ricinus communis*). A medicinal oil was extracted from what was probably one of the nettle tribe (*Urtica pilulifera*). Tea (*Triticum zeæ?*), olyra (*Holcus sorghum?*), and tiphe (*Triticum spelta*), were used in decoctions; opium was extracted from *Papaver somniferum*.•

Cnicus or atractylis (*Carthamus tinctorium?*) was a remedy against the poison of scorpions and other reptiles. Pliny says: "Homer attributes the glory of herbs to Egypt. He mentions many given to Helen by the wife of the Egyptian king, particularly the Nepenthes, which caused oblivion of sorrow." Opium was well known to the ancients, as well as various preparations of that drug. Sir J. Wilkinson thinks that nepenthe was perhaps the *burt* or *hasheesh*, a preparation of the *Cannabis sativa* or Indian hemp.

The Egyptians, says Ebers, thought that the kindly healing plants sprung up from the blood and tears of the gods.¹

Upon the ceilings and walls of the temples at Tentyra, Karnac, Luxor, and other places, basso-relievos have been discovered representing limbs that have been amputated with instruments very similar to those which are employed in such operations in our own time. Such instruments are also found in the hieroglyphics, and Larrey says² that there are vestiges of other surgical operations which have been discovered in Egyptian ruins which abundantly prove that the art of surgery was practised with great skill in the land of the Pharaohs.

Mr. Flinders Petrie, excavating at the Pyramid of Medum, says of the skeletons he discovered there: "The mutilations and diseases that come to light are remarkable. One man had lost his left leg below the knee; another had his hand cut off and put in the tomb; others seem to have had bones excised, and placed separately with the body. In one case acute and chronic inflammation and rheumatism of the back had united most of the vertebræ into a solid mass down the inner side. In another case there had been a rickety curvature of the spine. To find so many peculiarities in only about fifteen skeletons which I collected is strange. These are all in the Royal College of Surgeons now, for study."³

"Among the six hermetic books of medicine mentioned by Clement of Alexandria, was one devoted to surgical instruments; otherwise the very badly set fractures found in some of the mummies do little honour to the Egyptian surgeons" (Ebers).

¹ Lefébure has treated the subject in *Le Mythe Osirien*.

² See Cooper's *Surgical Dict.*, art. "Surgery."

³ *Ten Years' Digging in Egypt*, p. 146.

Flint instruments were always used for opening bodies, for circumcision and other surgical operations. How far this was dictated by religious respect for antiquity, or by sanitary reasons, cannot be said; probably, however, the reverence for the ancient flint knife had much to do with its retention.

Our word chemistry is derived from the name of Egypt, *Khem* or *Khemit*, the "Black Land," meaning the rich, dark soil of the Nile valley. The god Khem, also known as Min and Am, was the same as the Pan of the Greeks and Priapus of the Romans. He presided over productiveness and the kindly fruits of the earth. In this sense he was also the god of curative herbs and simples, and so became associated in the popular mind with the arts of healing.¹ Thus we obtain the words chemist, chemistry, and alchemy. Plutarch says that the Greek word *χημία*, for Egypt, was bestowed on the land on account of the black colour of its soil.

The Egyptians must have had considerable practical knowledge of chemistry, or they could not have succeeded so well in the manufacture of glass, in dyeing, and the use of mordants, etc. Metallurgy must have been understood, as is evidenced by their process of gold manufactures represented in several of the royal tombs. They made gold wire, and excelled in the art of gilding. Their methods of embalming also exhibit some chemical knowledge. Dr. Pettigrew says,² his friend Professor Reuven, of Leyden, examined a papyrus which contained upwards of one hundred chemical and alchemical formulæ.

In the Ebers Papyrus there are several recipes for the preparation of hair dye. "The earliest of all the recipes preserved to us is a prescription for dyeing the hair."³

Recipes for exterminating vermin and noxious creatures are found in the same work.

In anatomy, physiology, surgery, therapeutics, and chemistry it is evident that Egypt was far in advance of any other nation of the same period of which we have authentic accounts.

The Persian kings were glad to employ the Egyptian physicians, whose skill gained them high renown in the ancient world. Dr. Brugsch, in his account of the Egyptians in the Persian service, gives a translation of the inscriptions of Uza-hor-en-pi-ris, of the period of the conquest of Egypt by Cambyses. "O ye gods who are in Sais! Remember all the good that has been done by the president of the physicians, Uza-hor-en-pi-ris. In all that ye are willing to requite him

¹ *Pharaohs and Fellahs*, Amelia B. Edwards, p. 254.

² *Superstitions of Medicine*, etc., p. 7.

³ *Uarda*, Ebers.

for all his benefits, establish for him a great name in this land for ever. O Osiris! thou eternal one! The president of the physicians, Uza-hor-en-pi-ris, throws his arms around thee, to guard thy image; do for him all good according to what he has done, (as) the protector of thy shrine for ever.”¹ The last words addressed to Osiris refer to the form of the statue. The chief physician of Saïs is standing upright, with his hands embracing a shrine which holds the mummy of Osiris.

Whether the ancient Greeks derived their knowledge of medicine from Egypt or from India has often been debated; the evidence seems to show that Greece was indebted to India rather than to Egypt in this respect.

Mr. Flinders Petrie concludes “that Europe had an indigenous civilization, as independent of Egypt and Babylonia as was the indigenous Aryan civilization of India; that this civilization has acquired arts independently, just as much as India has, and that Europe has given to the East as much as it has borrowed from there.”²

Amongst the Egyptian fellahs some curious observances, says Mr. Flinders Petrie, are connected with accidental deaths. “Fires of straw are lighted, one month after the death, around the ground where the body has lain; and where blood has been shed, iron nails are driven into the ground, and a mixture of lentils, salt, etc., is poured out. These look like offerings to appease spirits, and the fires seem as if to drive away evil influences. Funeral offerings are still placed in the tombs for the sustenance of the dead, just as they were thousands of years ago.”³

• Modern Egyptians, like the ancient, wear written charms against sickness and disease. “Magical preparations of all sorts are frequently used as remedies in illness, and in even serious cases the patient is made to swallow pieces of paper inscribed with texts from the Koran, and to try various similar absurd means, before a physician is applied to.”⁴

¹ Brugsch, *Hist. Egypt*, vol. ii. p. 296.

² *Ten Years' Digging in Egypt*, p. 153.

³ *Ibid.*, p. 172.

⁴ Ebers, *Egypt*, vol. ii. p. 61.

CHAPTER II.

JEWISH MEDICINE.

The Jews indebted to Egypt for their Learning.—The only Ancient People who discarded Demonology.—They had no Magic of their own.—Phylacteries.—Circumcision.—Sanitary Laws.—Diseases in the Bible.—The Essenes.—Surgery in the Talmud.—Alexandrian Philosophy.—Jewish Services to Mediæval Medicine.—The Phœnicians.

THAT division of the Hebrew peoples which afterwards developed into Israel, left its home in the extreme south of Palestine some fifteen centuries before the Christian era to occupy the pasture lands of Goshen, in the territory of the Pharaohs, where they continued to retain their nomadic habits, their ancient language and patriarchal institutions. In process of time, however, the Egyptian sovereigns began to deal severely with their self-invited guests; they were forced to labour on the public works of Goshen; and though bitterly resenting this attempt to destroy their identity and reduce them to mere slavery, the proud and noble race was powerless to resist, and continued to labour on in despair until a deliverer arose in Moses, who led them out of Egypt to the land of Palestine which they had originally left. Moses was a pupil of the Egyptian priests, versed in all their wisdom, and imbued with the loftiest sentiments of the religion of Egypt. We shall expect to find in the medicine of the Jews abundant traces of their long residence in the land of the Pharaohs. Our sources for the history of the healing art and the theory of disease which obtained with the people of Israel are two—the Bible and the Talmud. Therein we shall see the influences, both external and internal, which made Jewish medicine what it was; and we shall be astonished, on comparing the theory of disease with that of all the other nations and peoples of the earth, to find that it stands by itself, is absolutely unique in its loftiness of idea, its absolute freedom from the absurd and degrading superstitions of the great and civilized nations amongst which they dwelt or by which they were surrounded. When we reflect on the religions of Egypt, Assyria, and Chaldæa, and compare their many gods with the one God of the Jews, their demonology, sorcery, and witchcraft with the pure and elevated faith of these nomads of the Sinaitic Peninsula, and re-

member that in all the earth at that time there was no other nation which had formulated such a pure theism, no other people which had broken away from the degrading and corrupting demonology which possessed the whole earth, we are compelled to recognise in God's ancient people the Jews the evidence of a teaching totally unlike anything which had preceded it. If the Bible, the Talmud, and the Koran are all three merely specimens of ancient literature, how comes it that the Bible is so infinitely superior, not only in its noble monotheism, but in its remarkable freedom from so many of the superstitions which, as we have seen, were everywhere intermixed with the noblest religious systems and the most advanced civilizations? Magic in the Bible is everywhere passed by with contempt. Whatever may be the precise date of the Psalms, they must have been written when all nations were sunk in the grossest superstition, and had resort to magical practices on the slightest pretence; yet there is a total absence of all superstition in the Psalms. Granting that the Book of Ecclesiastes is a mere piece of cynical philosophy, it contains no evidence of superstitious belief. The more ancient is a literature, the greater is the certainty that it will contain some reference to superstitious usages; yet how gloriously the oldest books of the Bible shine in their freedom from contamination with the demon-worship and conjuring arts of the nations surrounding the children of Israel.

As the author of the learned article on "Medicine" in Smith's *Dictionary of the Bible* says: "But if we admit Egyptian learning as an ingredient, we should also notice how far exalted above it is the standard of the whole Jewish legislative fabric, in its exemption from the blemishes of sorcery and juggling pretences. The priest, who had to pronounce on the cure, used no means to advance it, and the whole regulations prescribed exclude the notion of trafficking in popular superstition. We have no occult practices reserved in the hands of the sacred caste. It is God alone who doeth great things—working by the wand of Moses or the brazen serpent; but the very mention of such instruments is such as to expel all pretence of mysterious virtues in the things themselves." It is always God alone who is the healer: "I am the Lord that healeth thee" (Exod. xv. 26); "Heal me, O Lord, and I shall be healed" (Jer. xvii. 14); "For I will restore health unto thee, and I will heal thee of thy wounds, saith the Lord" (Jer. xxx. 17); "Who healeth all thy diseases" (Ps. ciii. 3); "He healeth the broken in heart, and bindeth up their wounds" (Ps. cxlvii. 3); "The Lord bindeth up the breach of His people, and healeth the stroke of their wound" (Isa. xxx. 26).

The priestly caste had no monopoly of the healing art; it might be,

practised by any one who was competent to afford medical aid. Physicians are mentioned in several passages.

Although the Hebrews had no magic of their own, and notwithstanding the stern severity with which it was prohibited in their law, there would naturally be many who transgressed their law and imported the superstitious practices from the surrounding peoples.

The teraphim of Laban which were stolen by Rachel¹ is the earliest example in the Bible of magical instruments. It seems that these objects were a kind of idols in the shape of a human figure; their use was condemned by the prophets, but they were for ages used in popular worship, both domestic and public. Hosea says:² "The children of Israel shall abide many days without a king, and without a prince, and without a sacrifice, and without an image, and without an ephod, and *without* teraphim." In this passage the teraphim and ephod are classed with the sacrifice, as though equally essential for worship. Some students think that the teraphim were the Kabeiri gods;³ whatever they were, they were worshipped or used superstitiously by Micah, by the Danites, and others.⁴ They were used magically for the purpose of obtaining oracular answers, and were associated with the practice of divination.⁵

The phylacteries of the Jews were charms or amulets in writing. They were believed to avert all evils, but were especially useful in driving away demons. They put faith, also, in precious stones. To this day one may see at the door of every Jewish house the mezûza—a scrap of sacred writing—affixed diagonally on the right doorpost, enclosed in a metal case. The texts contained are inscribed on parchment, and the words are from Deuteronomy vi. 4-9; xi. 13-21. In the Targum on Canticles viii. 3, we learn that the phylactery and mezûza were supposed to keep off hurtful demons. This is merely the corruption of a perfectly innocent idea; it is an example of the way in which harmless things become degraded to superstitious uses. The scapular of little squares of brown cloth worn by Catholics originally meant no more than the investiture, in a secret and unassuming manner, with the habit of the Carmelite order, and allowed pious persons living "in the world" to feel that they were affiliated to a famous and saintly community. When the Catholic wore it, he knew that he assumed the badge of the Blessed Virgin; there was no more in it than that. Amongst the ignorant and superstitious it is now commonly believed that the wearer is protected from death by fire and drowning, and that

¹ Gen. xxxi. 19, 30.

² *Isis Unveiled*, vol. i. p. 570.

³ Ezekiel xxi. 19-22.

⁴ Chap. iii. 4.

⁵ Judges xvii.-xviii.

Our Lady will liberate him from purgatory on the first Saturday after his arrival there.

"To the mind of the Israelite," says Mr. Tylor, "death and pestilence took the personal form of the destroying angel who smote the doomed."¹

God is plainly declared, in Exodus xv. 26, to send diseases upon men as a punishment for the breach of His commandments, and this has been adduced to show that the Jews traced their maladies to the anger of an offended Deity; and thus it has been argued that their etiology of disease was not higher than that of the other nations. But this argument is unfair. The Mosaic law was to a great extent a sanitary code, and even in the light of modern science we are compelled to admire the wisdom of the laws which have for so many centuries made the Jews the healthiest and most macrobiotic of peoples.

The rite of circumcision was not peculiar to the Jews; and just as baptism was an initiatory rite borrowed from another religion, yet made distinctive of Christianity, so circumcision has come to be considered a peculiarly Jewish practice. It may have been with the Israelites a protest against the phallus worship which is of such remote antiquity, and which was the foundation of the myth of Osiris. Wunderbar² asserts that it distinctly contributed to increase the fruitfulness of the race and to check inordinate desires in the individual. There are excellent surgical reasons for both these suppositions, in addition to which we may add that it contributed to cleanliness and prevented irritation. Wunderbar, moreover, seems to have established his statement that after circumcision there is less probability of the absorption of syphilitic virus, and he has instanced the fact that such specific disease is less frequent with Jewish than with Christian populations.³

"Circumcision," says Pickering, speaking of the Polynesian practice, "was now explained; and various other customs, which had previously appeared unaccountable, were found to rest on physical causes, having been extended abroad by the process of imitation."⁴

The same writer states that the practice is "common to the ancient inhabitants of the Thebaid, and also to the modern Abyssinians and their neighbours in the South."⁵

Ewald⁶ says that circumcision was practised by various Arabian tribes, in Africa, amongst Ethiopic Christians and the negroes of the Congo. It was also practised on girls by Lydian, Arabian, and African.

¹ *Primitive Culture*, vol. i. p. 267. ² Samuel xxiv. 16; 2 Kings xix. 35.

³ 3tes Heft, p. 25.

⁴ *Ibid.*, p. 27.

⁵ *Races of Man*, p. 153.

⁶ *Ibid.*, p. 293.

⁶ *Antiquities of Israel*, p. 90.

tribes, as Philo and Strabo inform us. Ewald considers it originated as an offering of one's own flesh and blood in sacrifice to God, and may have been considered as a substitute for the whole body of a human being.

Circumcision is practised amongst Australian savages on the Murray River, as also another incredible ceremonial, as Lubbock terms it.¹

Castration is hinted at in Matthew xix. 12 as an operation well understood.

In hot climates extra precautions for cleanliness have to be adopted beyond those which would amply suffice in northern lands. Captain Burton says :²—

However much the bath may be used, the body-pile and hair of the arm-pits, etc., if submitted to a microscope, will show more or less sordes adherent. The axilla hair is plucked, because if shaved the growing pile causes itching, and the depilatories are held to be deleterious.

Sometimes Syrian incense or fir-gum, imported from Scio, is melted and allowed to cool in the form of a pledget. This is passed over the face, and all the down adhering to it is pulled up by the roots. He adds that many Anglo-Indians adopt the same precautions.

Ewald, referring to the laws concerning women, says :³ “The monthly period of the woman brought with it the second grade of uncleanness, which lasted the space of seven days, but without rendering necessary the use of specially prepared water. Everything on which the woman sat or lay during this time, and every one who touched such things or her, incurred the uncleanness of the first grade.”

We find the demon-theory of disease in force in the time of Josephus. He says :⁴—

“Now within this place there grew a sort of rue, that deserves our wonder on account of its largeness, for it was no way inferior to any fig-tree whatsoever, either in height or in thickness; and the report is that it had lasted ever since the time of Herod, and would probably have lasted much longer had it not been cut down by those Jews who took possession of the place afterward; but still in that valley which encompasses the city on the north side, there is a certain place called Baaras, which produces a root of the same name with itself; its colour is like to that of flame, and towards evening it sends out a certain ray like lightning; it is not easily taken by such as would do it, but recedes from their hands; nor will yield itself to be taken quietly, until either

¹ “Finditur usque ad urethram à parte inferâ penis.”—Eyre, vol. ii. p. 332.

² *Arabian Nights*, vol. ii. p. 160, note 3.

³ *Antiquities of Israel*, p. 156.

⁴ *Wars*, vii. 6, 3.

οὖρον γυναικὸς ἢ τὸ ἐμμηνον αἷμα be poured upon it; nay, even then it is certain death to those that touch it, unless any one take and hang the root itself down from his hand, and so carry it away. It may also be taken another way, without danger, which is this: they dig a trench quite round about it, till the hidden part of the root be very small; they then tie a dog to it, and when the dog tries hard to follow him that tied him, this root is easily plucked up, but the dog dies immediately, as if it were instead of the man that would take the plant away; nor after this need any one be afraid of taking it into their hands. Yet, after all this pains in getting, it is only valuable on account of one virtue it hath—that if it be only brought to sick persons, it quickly drives away those called Demons, which are no other than the spirits of the wicked, that enter into men that are alive and kill them, unless they can obtain some help against them.”

If we may consider Josephus as a fair type of the learned and liberally educated men of his time, we are compelled to admit that the theory of disease held by the Hebrews of the period was not much, if at all, in advance of the rest of the world. It was undoubtedly largely the demoniacal theory of sickness. In the *Antiquities of the Jews*¹ Josephus, in his description of the sagacity and wisdom of Solomon, says: “God also enabled him to learn the skill that expels demons, which is a science useful and sanative to men. He composed such incantations also by which distempers are alleviated. And he left behind him the manner of using exorcisms, by which they drive away demons so that they never return; and this method of cure is of great force unto this day; for I have seen a certain man of my own country, whose name was Eleazar, releasing people that were demoniacal.” He goes on to describe the process of extracting the demon from the sick man through his nostrils.

So again, in telling the story of Saul's possession by the evil spirit from the Lord, he says:² “The physicians could find no other remedy but this—that if any person could charm those passions by singing and playing upon the harp, they advised them to inquire for such a one.” He seems to imply that David cured Saul by an incantation; and Spanheim, commenting upon the story, says that the Greeks had such singers of hymns, and that usually children or youths were picked out for that service, and that they were called singers to the harp.³

Whether David merely influenced Saul in the natural and touching way so beautifully described by Robert Browning in his poem “Saul,” we must bear in mind that an “incantation” was precisely of the

¹ Book VIII. chap. iii. 5.

² *Antiq.*, Book VI. chap. viii. 2.

³ Note to Whiston's Josephus, *loc. cit.*

character of the Bible story, and that the demon theory of Saul's malady is plainly stated.¹

Herzog² enumerates the following as the diseases of the Bible :—

1. *Fever and ague* (Lev. xxvi. 16). 2. *Dysentery* (Acts xxviii. 8), with, probably, *prolapsus ani*, as in Jehoram's case (2 Chron. xxi. 15, 19).
3. *Inflammation of the eyes*, due to heat, night dews, sea breeze, flying sand, injuries, etc. (Lev. xix. 14; Deut. xxvii. 18; Matt. xii. 22, etc.).
4. *Congenital blindness* (John ix. 1). 5. *Disease of the liver*. 6. *Hypochondria*. 7. *Hysteria*. 8. *Rheumatism and gout* (John v. 2, 3).
9. *Consumption*, a general term, including hectic, typhoid, and other fevers (Lev. xxvi. 16; Deut. xxviii. 22, etc.). 10. *Phthisis* (?), indicated by leanness (Isa. x. 16).
11. *Atrophy of muscles*, "withered hand," being due either to rheumatism, plugging up of the main artery of the limb, or paralysis of the principal nerve, etc. (Matt. xii. 10; 1 Kings xiii. 4-6, etc.). 12. *Fevers in general* (Matt. viii. 14, etc.).
13. *Pestilence* (Deut. xxxii. 24). 14. *Oriental pest*, the so-called "bubonensest," characterised by swellings in the groins, armpits, etc.; a very fatal disorder (Lev. xxvi. 25; Deut. xxviii. 21, 27, 60, etc.).
15. *Boils* (2 Kings xx. 7, etc.). 16. *Sunstroke* (2 Kings iv. 19, etc.).
17. *Gonorrhæa* (Lev. xv. 2). 18. *Metrorrhagia*, or uterine hemorrhage (Lev. xv. 25; Luke viii. 43, etc.). 19. *Sterility* (Gen. xx. 18, etc.).
20. *Asa's foot disease*, either œdema or gout (2 Chron. xvi. 12). 21. *Elephantiasis* (?) (Job ii. 7). 22. *Dropsy* (Luke xiv. 2). 23. *Cancer* (2 Tim. ii. 17).
24. *Worms*; may have been phthiriasis (lice) (2 Macc. ix. 5-9). 25. *Leprosy*. 26. *Itch* and other skin diseases (Deut. xxviii. 27).
27. *Apoplexy* (1 Sam. xxv. 37, etc.). 28. *Lethargy* (Gen. ii. 21; 1 Sam. xxvi. 12). 29. *Paralysis*, palsy (Matt. iv. 24; Acts iii. 2, etc.).
30. *Epilepsy*, the so-called "possession of devils" (Matt. iv. 24, etc.).
31. *Melancholia*, madness (Deut. xxviii. 28, etc.). 32. *Nervous exhaustion* (1 Tim. v. 23).
33. *Miscarriage* (Exod. xxi. 22). 34. "*Boils and blains*," erysipelatous (Exod. ix. 9).
35. *Gangrene and mortification* (2 Tim. ii. 17). 36. *Poisoning by arrows* (Job vi. 4). *Poisoning from snake-bite* (Deut. xxxii. 24).
37. *Scorpions and centipedes* (Rev. ix. 5, 10). 38. *Old age*, as described in Eccles. xii. I am inclined to add to this list *Syphilis*, which seems to me to be clearly indicated by several verses in Proverbs xii., in the warnings against the strange woman, e.g. verses 22, 23, 26, and 27.

The law forbade a Levite who was blind to act as a physician. Anatomy and pathology were not understood, as it was considered pollution even to touch the dead.

The surgical instruments of the Bible are the sharp stone or flint

¹ 1 Sam. xvi. 15.

² *Religious Encyclopædia*, vol. ii. p. 1454.

knives with which circumcision was performed, and the awl with which a servant's ear was bored by his master (Exod. iv. 25 ; Josh. v. 2 ; Exod. xxi. 6). Roller bandages are referred to for fractures (Ezek. xxx. 21). Job used a scraper when he was smitten with boils (Job ii. 8). The materia medica of the Bible is meagre. A poultice of figs—a favourite remedy in ancient times—is ordered in 2 Kings xx. 7.

Fish galls (Tobit xi. 4-13) and fasting saliva are used (Mark viii. 23).

The only regular prescription mentioned is that in Exodus xxx. 23-25.

Midwives were regularly employed to assist Hebrew mothers.

The "bearing stool" was employed.

There is a very beautiful figurative description of the disease of old age or senile decay given by Solomon in the Book of Ecclesiastes:—

"Remember now thy Creator in the days of thy youth, while the evil days come not, nor the years draw nigh, when thou shalt say, I have no pleasure in them ; while the sun, or the light, or the moon, or the stars, be not darkened, nor the clouds return after the rain : in the day when the keepers of the house shall tremble, and the strong men shall bow themselves, and the grinders cease because they are few, and those that look out of the windows be darkened, and the doors shall be shut in the streets, when the sound of the grinding is low, and he shall rise up at the voice of the bird, and all the daughters of musick shall be brought low ; also *when* they shall be afraid of *that which is* high, and fears *shall be* in the way, and the almond tree shall flourish, and the grasshopper shall be a burden, and desire shall fail : because man goeth to his long home, and the mourners go about the streets : or ever the silver cord be loosed, or the golden bowl be broken, or the pitcher be broken at the fountain, or the wheel broken at the cistern. Then shall the dust return to the earth as it was : and the spirit shall return unto God who gave it."

Dr. Mead, in his treatise on the diseases of old age,¹ thus explains the curious figurative phrases. By the darkening of the sun, moon, and stars, he says we are to understand the obscuration of the mental faculties, which is so common in advanced life. The clouds returning after rain symbolise the cares and troubles which oppress the aged ; especially when the vigour of the mind is lessened, so that they cannot cast them off. From the mind we pass to the body : "the keepers of the house shall tremble," etc. That is to say, the limbs which support the body grow feeble and relaxed, and are incapable of defending us against injuries. The grinders are the molar teeth. The failing sight is compared to the darkness which meets those who look out of the windows. By dimin-

¹ *Medica Sacra*, p. 40 et seq.

ished appetite the mouth, which is the door of the body, is less frequently opened than in youth. The sound of the grinding of the teeth is low, because old people have, in the absence of them, to eat with their gums. The rising up at the voice of the bird signifies the short and interrupted sleep of the aged. By the daughters of music we are to understand the ears, which no longer administer to our pleasure in conveying harmonious sounds. The sense of feeling is diminished, and the aged are fearful of stumbling in the way. The early flowers of spring shall flourish in vain. The phrase, the grasshopper shall become a burden, according to Dr. Mead, is the modest Hebrew mode of describing the effects of scrotal rupture. He says the grasshopper is made up chiefly of belly, and when full of eggs bears some resemblance to a scrotum smitten by a rupture. "Desire shall be lost" is like Ovid's *Turpe senilis amor*, and does not refer to appetite for food. The loosened silver cord is the vertebral column; the medulla oblongata is of a silver or whitish colour. The golden bowl expresses the dignity of the head, from which in old age come defluxions to the nose, eyes, and mouth. Incontinence of urine is a common trouble of the aged, well expressed by the figure of the pitcher broken at the fountain; and the wheel at the cistern, to those who knew nothing of the circulation of the blood, fairly describes the failing heart, no longer capable of propelling the stream of life through the vessels.

Referring to the words, "The sun shall not smite thee by day, nor the moon by night" (Psalm cxxi. 6), Captain Burton says¹ that he has seen a hale and hearty Arab, after sitting an hour in the moonlight, look like a man fresh from a sick-bed; and he knew an Englishman in India whose face was temporarily paralysed by sleeping with it exposed to the moon.

The captivity at Babylon brought the Jews into contact with a nobler and very high civilization. In many ways there is no doubt that Jewish thought was greatly developed and enlarged by association with the peoples of Babylonia and Assyria. What precise influences the Jews became subject to in this captivity we have not the means to determine; but the fact that the Greek physician Democedes visited the court of Darius, proves that Eastern lands had in some measure fallen under the influence of Greek thought, about the time of Ezra. The Book of Ecclesiasticus is supposed to belong to the period of the Ptolemies, and in that work we find practitioners of medicine held in high esteem. "Honour a physician with the honour due unto him for the uses which ye may have of him; for the Lord hath created him. . . . The skill of the physician shall lift up his head; and in the sight of great

¹ *Arabian Nights*, vol. ii. p. 4.

men he shall be in admiration. The Lord hath created medicines out of the earth; and he that is wise will not abhor them. . . . Then give place to the physician, for the Lord hath created him; let him not go from thee, for thou hast need of him."¹

A very interesting but mysterious sect of the Jews was the *ESSENES* (B.C. 150). Our knowledge of this ancient community is chiefly derived from Josephus,² who says that they studied the ancient writers principally with regard to those things useful to the body and the soul, that they thus acquired knowledge of remedies for diseases, and learned the virtues of plants, stones, and metals. Another name for the Essenes was the Therapeutists, or the Healers.³

They lived somewhat after the fashion of monks, and had a novitiate of three years. Some of their principles and rules suggest a connection with Pythagorism and Zoroastrianism. De Quincey finds in Essenism a saintly scheme of Ethics, a "Christianity before Christ, and consequently without Christ."⁴ Recent scholarship, says Professor Masson, will not accept his conclusions concerning this remarkable secret society.⁵

The surgery of the Talmud includes a knowledge of dislocations of the thigh, contusions of the head, perforation of the lungs and other organs, injuries of the spinal cord and trachea, and fractures of the ribs. Polypus of the nose was considered to be a punishment for past sins. In sciatica the patient is advised to rub the hip sixty times with meat-broth. Bleeding was performed by mechanics or barbers.

The pathology of the Talmud ascribes diseases to a constitutional vice, to evil influences acting on the body from without, or to the effect of magic.

Jaundice is recognised as arising from retention of the bile, dropsy from suppression of the urine. The Talmudists divided dropsy into anasarca, ascites, and tympanites. Rupture and atrophy of the kidneys were held to be always fatal. Hydatids of the liver were more favourably considered. Suppuration of the spinal cord, induration of the

¹ *Ecclesiasticus* xxxviii. 1, 3, 4, 12. From the many references to disease in this book, it has been supposed by some commentators that the author was a physician. The writer of the article on "Medicine," in *Smith's Dictionary of the Bible*, remarks that "if he was so, the power of mind and wide range of observation shown in this work, would give a favourable impression of the standard of practitioners; if he was not, the great general popularity of the study and practice may be inferred from its thus becoming a common topic of general advice offered by a non-professional writer."

² *Wars of the Jews*, Book II. chap. viii; *Antiq.*, xviii. 1, 5.

³ See Lightfoot on the *Colossians*.

⁴ *Works*, vol. i. p. 10.

⁵ *Ibid.*, vol. vii. p. 7.

lungs, etc., are incurable. Dr. Baas¹ says that these are "views which may have been based on the dissection of [dead] animals, and may be considered the germs of pathological anatomy." Some critical symptoms are sweating, sneezing, defecation, and dreams, which promise a favourable termination of the disease.

Natural remedies, both external and internal, were employed. Magic was also Talmudic. Dispensations were given by the Rabbis to permit sick persons to eat prohibited food. Onions were prescribed for worms; wine and pepper for stomach disorders; goat's milk for difficulty of breathing; emetics in nausea; a mixture of gum and alum for menorrhagia (not a bad prescription); a dog's liver was ordered for the bite of a mad dog. Many drugs, such as assafoetida, are evidently adopted from Greek medicine. The dissection of the bodies of animals provided the Talmudists with their anatomy. It is, however, recorded that Rabbi Ishmael, at the close of the first century, made a skeleton by boiling of the body of a prostitute. We find that dissection in the interests of science was permitted by the Talmud. The Rabbis counted 252 bones in the human skeleton.

It was known that the spinal cord emerges from the foramen magnum, and terminates in the cauda equina. The anatomy of the uterus was well understood. A very curious point in their anatomy was the assumption of the existence of a fabulous bone, called "Luz," which they held to be the nucleus of the resurrection of the body.²

(The Arabians call this bone "Aldabaran.")

They discovered that the removal of the spleen is not necessarily fatal.

According to the Talmudists, the elementary bodies are earth, air, fire, and water. Pregnancy, they held, lasts 270 to 273 days (280 days is the modern calculation), and that it cannot be determined before the fourth month.

Alexandrian philosophic thought received a new impulse in consequence of the conciliatory policy which the Ptolemies pursued towards the Jews. Under Soter they were encouraged to settle in Alexandria, and soon their numbers became very great. Egypt at one time contained altogether some 200,000 Jews. Alexandria became for several centuries the centre of Jewish thought and learning. But the learning

¹ *History of Medicine*, p. 36.

² "'How doth a man revive again in the world to come?' asked Hadrian; and Joshua Ben Hananiah made answer, 'From luz in the backbone.' He then went on to demonstrate this to him. He took the bone luz, and put it into water, but the water had no action on it; he put it in the fire, but the fire consumed it not; he placed it in a mill, but could not grind it; and laid it on an anvil, but the hammer crushed it not."—*Lightfoot*.

of the Rabbis became a shallow pedantry in the course of time, and their faith in the inspiration of their scriptures ultimately degenerated into a Cabalism, which in its turn lent itself to jugglery and magic-mongering, and infected the medicine of the Roman world, just as the healing art had emancipated itself from superstition, theurgy, and philosophical sophistries.

Kingsley has told us how this Jewish magic arose.¹ "If each word [of the Scriptures] had a mysterious value, why not each letter? And how could they set limits to that mysterious value? Might not these words, even rearrangements of the letters of them, be useful in protecting them against the sorceries of the heathen, in driving away these evil spirits, or evoking those good spirits who, though seldom mentioned in their early records, had, after their return from Babylon, begun to form an important part of their unseen world?"

Jewish Cabalism formed itself into a system at Alexandria. It was there, as Kingsley goes on to say, that the Jews learnt to become the magic-mongers which Claudius had to expel from Rome as pests to rational and moral society.

According to the Jewish doctors, three angels preside over the art of medicine. Their names, according to Rabbi Elias, are Senoi, Sansenoi, and Sanmangelof.²

In the Middle Ages the Jews rendered the greatest services to the healing art, and had a large share in the scientific work connected with the Arab domination in Spain. The great names of MOSES MAIMONIDES and IBN EZRA attest the dignity of Jewish intellectual life in the Dark Ages. The Golden Age of the modern Jews, as Milman³ designates it, begins with the Caliphs and ends with Maimonides. The Hebrew literature was eminently acceptable to the kindred taste of the Saracens, and the sympathy between Arab and Jewish practitioners and students of medicine was fraught with the greatest benefit to the healing art. The Golden Age of the Jews was at its height in the time of Charlemagne, when kings could not write their names. Their intelligence and education fitted them to become the physicians and the ministers of nobles and monarchs. During the reign of Louis the Debonnaire the Jews were all-powerful at his court. His confidential adviser was the Jewish physician Zedekiah, who was a profound adept in magic. In an age when monkish historians could relate "with awe-struck sincerity," as Milman describes it,⁴ the tales of his swallowing a cartload of hay, horses and all, it is not difficult to understand that an acquaintance with the best knowledge of his time would account for the estimation in

¹ *Alexandria and her Schools*, p. 74. ² Le Clerc, *Hist. de la Méd.*, Pt. I. 2, 4.

³ *History of the Jews*, Book xxiii.

⁴ *Ibid.*

which a man of science was held. Maimonides lived at the court of the Sultan of Egypt as the royal physician, in the highest estimation.

The Phœnicians were devoted to phallic-worship. The instrument of procreative power was the chief symbol of their religion. Astarte was their great goddess. Baal-Zebub, the Beelzebub of the Bible, was their god of medicine, and the arbiter of health and disease. The Cabeiri, or Corybantes, considered by some authorities to be identical with the Titans, by others with the sons of Noah, were considered as the discoverers of the properties of the medicinal herbs, and the teachers of the art of healing to mortals.¹

¹ G. S. Faber, *The Cabiri*, vol. i.

CHAPTER III.

THE MEDICINE OF CHALDÆA, BABYLONIA, AND ASSYRIA.

The Ancient Religion of Accadia akin to Shamanism.—Demon Theory of Disease in Chaldean Medicine.—Chaldean Magic.—Medical Ignorance of the Babylonians.—Assyrian Disease-Demons.—Charms.—Origin of the Sabbath.

CHALDÆA was probably only second to Egypt in the antiquity of its civilization. The founders of the Babylonian and Assyrian empires were a Semitic tribe, and were the first people who worked in metals, and their knowledge of astronomy proves them to have been possessed of some amount of scientific attainments. Their practice of medicine was inextricably mixed with conjurations of spirits, magic, and astrology.

The name now given to the primitive inhabitants of Babylôn is Accadians. Sayce considers them to have been the earliest civilizers of Eastern Asia. From the Accadians, he thinks the Assyrians, Phœnicians, and Greeks derived their knowledge of philosophy and the arts. Their libraries existed seventeen centuries B.C.

The ancient religion of Accad was very similar to the Shamanism professed by Siberian and Samoyed tribes at the present time. There was believed to be a spirit in every object. Good or bad spirits swarmed in the world, and there was scarcely anything that could be done which might not risk demoniacal possession. These good and bad spirits were controlled by priests and sorcerers. All diseases were caused by evil spirits, and the bulls and other creatures which guarded the entrance to houses were there to protect them from their power. The priests were magicians. There were at one period of the development of the Babylonian mythology three hundred spirits of heaven and six hundred spirits of earth; the most dreadful of these latter were the "seven spirits," who were born without father and mother, and brought plague and evil on the earth. Magic formulæ for warding off the attacks of demons were commonly used, and charms and talismans were extensively employed. The phylacteries of the Jews were talismans, and were of Accadian origin. The sorcerer bound his charm, "knotted with seven knots, round the limbs of the sick man, and this,

with the further application of holy water, would, it was believed, infallibly produce a cure; while the same result might be brought about by fixing a sentence out of a good book on the sufferer's head as he lay in bed." ¹

Accadian literature, Mr. George Smith tells us, is rich in collections of charms and formulæ of exorcism belonging to the very earliest period of Babylonian history. There are magic formulæ of all kinds, some to ward off sorcery, some to bewitch other persons.

The following is a specimen of the exorcisms used to drive away evil spirits, and to cure the diseases which were believed to be caused by their agency:—

"The noxious god, the noxious spirit of the neck, the spirit of the desert, the spirit of the mountain, the spirit of the sea, the spirit of the morass, the noxious cherub of the city, this noxious wind which seizes the body (and) the health of the body: O, spirit of heaven, remember! O, spirit of earth, remember!

"The burning spirit of the neck which seizes the man, the burning spirit which seizes the man, the spirit which works evil, the creation of the evil spirit: O, spirit of heaven, remember! O, spirit of earth, remember!

"Wasting, want of health, the evil spirit of the ulcer, spreading quinsey of the gullet, the violent ulcer, the noxious ulcer: O, spirit of heaven, remember! O, spirit of earth, remember!

"Sickness of the entrails, sickness of the heart, the palpitation of a sick heart, sickness of bile, sickness of the head, noxious colic, the *agitation* of terror, flatulency of the entrails, noxious illness, lingering sickness, nightmare: O, spirit of heaven, remember! O, spirit of earth, remember!" ²

In the great magic collection of invocations copied by the order of Asurbanipal, we have a long litany on the "Spirit of Fever"; the lords and ladies of the earth, stars, the light of life, the spirit of Hurki and his talismanic ship, the spirit of Utu, umpire of the gods, and many others are implored to "conjure it." ³

Professor Lenormant considers that the idea of punishment of sin by means of disease was a dogma of a later school of Chaldæan thought. The old religion of spirits upon which Chaldæan magic was originally founded was independently the doctrine of the priests of magic, so that there were two sets of priests in later Chaldæan civilization—the old class who composed incantations to the spirits who

¹ Art. on "Babylon," by Rev. A. H. Sayce, in *Ency. Brit.*

² *Hist. Babylonia*, Geo. Smith, pp. 21, 22.

³ Lenormant, *Chaldæan Magic*, pp. 139, 140.

fought with and replaced the disease-demons, and the theological priests who urged repentance for sin as the only means of the cure of disease.¹

In the Accadian philosophy there was in everything a dualism of spirits. Innumerable hosts of them caused all the phenomena of nature, from the movements of the stars to the life and death, the health and disease of every human being. This dualism was as marked as that of the religion of Zoroaster; everywhere and in everything the good spirits fought against the evil ones, discord prevailed throughout the universe; and on this conception rested the whole theory of sacred magic. Man's only help against the attacks of bad spirits, and the plagues and diseases which they brought upon him, lay in the invocation of good spirits by means of priests, sacred rites, talismans, and charms. These could put to flight the demons by helping the good spirits in their constant warfare with them. Magic therefore became a system elaborated with scientific exactness, and a vast pantheon of gods became necessary. Hea was the great god of conjurational magic; he was the supreme protector of men and of nature in the war between good and evil. When neither word, nor rite, nor talisman, nor help of the other divinities of heaven availed to help mankind, Hea was all-powerful; and this was because, as Lenormant says,² Hea was alone acquainted with the awful power of the supreme name. "Before this name everything bows in heaven and in earth and in Hades, and it alone can conquer the *Maskim* (a species of evil demon), and stop their ravages. The gods themselves are enthralled by this name, and render it obedience."

Images of demons were used by the Chaldeans as talismans against the attacks of demons. In a magical hymn to the sun against sorcery and witchcraft, and their influence on the worshipper, the sun is reminded that the images of the bad spirits have been shut up in heaps of corn. The invocation concludes:—

"May the great gods, who have created me, take my hand! Thou who curest my face, direct my hand, direct it, lord, light of the universe, Sun."³

In a hymn composed for the cure of some disease, the priest, addressing the god, speaks of the invalid in the third person:—

"As for me, the lord has sent me, the great lord, Hea, has sent me. — — —

Thou, at thy coming, cure the race of man, cause a ray of health to shine upon him, cure his disease.

¹ See on this the chapter on "The Religious Systems of the Accadian Magic Books," Lenormant, *Chaldean Magic*, chap. xi.

² Lenormant, *Chaldean Magic*, p. 42.

³ *Ibid.*, p. 179.

The man, son of his god, is burdened with the load of his omissions and transgressions.

His feet and his hands suffer cruelly, he is painfully exhausted by the disease.

Sun, at the raising of my hands, come at the call, eat his food, absorb his victim, turn his weakness into strength."¹

In the "War of the Seven Wicked Spirits against the Moon," we have an incantation which was destined to cure the king of a disease caused by the wicked spirits.²

In the Chaldæan creed all diseases were the work of demons. This is why Herodotus found no physicians in Babylon and Assyria. There was no science of medicine; "it was simply a branch of magic, and was practised by incantations, exorcism, the use of philters and enchanted drinks."³

Of course the priests made it their business to compound their drinks of such drugs as they had discovered to possess therapeutic virtue. In ancient times magic and medicine were thus closely united. It could not have been always faith alone which cured the patient, but faith plus a little poppy juice would work wonders in many cases. It became therefore greatly to the interest of the priests and magicians to learn the properties of herbs, and the value of the juices and extracts of plants. Out of evil, therefore, mankind reaped this great and valuable knowledge. The two gravest and most fatal diseases with which the Chaldæans were acquainted, says M. Lenormant,⁴ were the plague and fever, the *Namtar* and the *Idpa*. Naturally they were represented as two demons, the strongest and most formidable who afflict mankind. An old fragment says:—

The execrable *Idpa* acts upon the head of man,
The malevolent *Namtar* upon the life of man,
The malevolent *Utug* upon the forehead of man,
The malevolent *Alal* upon the chest of man,
The malevolent *Gigim* upon the bowels of man,
The malevolent *Telal* upon the hand of man.⁵

The use of magic knots as a cure for diseases was firmly believed in by the ancient Chaldees. M. Lenormant⁶ gives a translation of one of the formulæ supposed to have been used against diseases of the head.

Knot on the right and arrange flat in regular bands, on the left
a woman's diadem;
divide it twice in seven little bands; . . .

¹ Lenormant, *Chaldæan Magic*, p. 181.

² *Ibid.*, p. 35.

³ *Ibid.*, p. 41.

⁴ *Ibid.*, p. 36.

⁵ *Ibid.*, pp. 204-209.

⁶ *Ibid.*, p. 36.

gird the head of the invalid with it ;
 gird the forehead of the invalid with it ;
 gird the seat of life with it ;
 gird his hands and his feet ;
 seat him on his bed ;
 pour on him enchanted waters.
 Let the disease of his head be carried away into the heavens like
 a violent wind ; . . .
 may the earth swallow it up like passing waters !

Sir Henry Rawlinson has discovered that there were three classes of Chaldean doctors, exactly in accordance with the enumeration of the prophet Daniel. These were the *Khartumim*, or conjurors, the *Chakamim*, or physicians, and the *Asaphim*, or theosophists (see Daniel ii. 2 ; v. 11).

The Babylonian doctrine of disease was that the hosts of evil spirits in the air entered man's body, and could only be expelled by the incantations of the exorcist. These disease-demons were addressed as "the noxious neck spirit," "the burning spirit of the entrails which devours the man." Headache was caused by evil spirits which were commanded by the charmer to fly away "like grasshoppers" into the sky.¹

Herodotus says of the Babylonians : "The following custom seems to me the wisest of their institutions. They have no physicians, but when a man is ill, they lay him in the public square, and the passers-by come up to him, and if they have ever had his disease themselves, or have known any one who has suffered from it, they give him advice, recommending him to do whatever they found good in their own case, or in the case known to them ; and no one is allowed to pass the sick man in silence without asking him what his ailment is."²

A Babylonian exorcism of disease-demons has been found in the following terms : the translation is by Prof. Sayce.³

"On the sick man, by means of sacrifice, may perfect health shine like bronze ; may the sun-god give this man life ; may Merodach, the eldest son of the deep, give him strength, prosperity, and health ; may the king of heaven preserve, may the king of earth preserve."

A curse against a sorcerer declares that "by written spells he shall not be delivered."

The elementary spirits were supposed to be seven baleful winds, which were considered general causes of disease. One of the formulæ

¹ See E. B. Tylor, art. "Demonology," *Ency. Brit.* ; *Records of the Past*, vols. i., iii. ; Birch's trans. *Book of the Dead* ; Lenormant, Maspero, and others.

² *Herodotus*, Book I. 197, tr. Rawlinson.

³ *Records of the Past*, vol. i. p. 135.

of exorcising these dreadful seven is translated by Mr. Smith from a great collection of hymns to the gods which was compiled B.C. 2000.

"Seven (are) they, seven (are) they.
In the abyss of the deep seven (are) they.
In the brightness of heaven seven (are) they.
In the abyss of the deep in a palace (was) their growth.
Male they (are) not, female they (are) not.
Moreover the deep (is) their pathway.
Wife they have not, child is not born to them.
Law (and) kindness know they not.
Prayer and supplication hear they not.
(Among) the thorns of the mountain (was) their growth.
To Hēa (the god of the sea) (are) they hostile.
The throne-bearers of the gods (are) they.
Disturbing the watercourse in the canal are they set.
Wicked (are) they, wicked (are) they.
Seven (are) they, seven (are) they, seven twice again are they." ¹

M. Lenormant gives a translation of a very long Accadian incantation against disease-demons; it is in the form of a litany, and each verse ends with the words:—

"Spirit of the heavens, conjure it! Spirit of the earth, conjure it!"

There are some twenty-eight verses in all, and a great number of diseases are mentioned. I have only space for a few of these.

"Ulcers which spread, malignant ulcers."

"Disease of the bowels, the disease of the heart, the palpitation of the diseased heart,
Disease of the vision, disease of the head," etc.

"Painful fever, violent fever,
The fever which never leaves man,
Unremitting fever,
The lingering fever, malignant fever.
Spirit of the heavens, conjure it," etc., etc.

In the Assyrian version it seems to be hinted that the expectoration of phthisical patients was as dangerous as our modern bacteriologists declare it to be, for we have these words:—

"The poisonous consumption which in the mouth malignantly ascends." ²

In the course of Layard's excavations at Nineveh, a divining chamber was discovered, at the entrance to which figures of the magi were found. One of the orders of these magicians was the "Mecasphim," translated by Jerome and the Greeks "enchanters," such as used noxious herbs and drugs, the blood of victims, and the bones of the

¹ *Hist. Babylon*, p. 22.

² Lenormant, *Chaldean Magic*, p. 6.

dead for their superstitious rites. Another class was the "Casdim," who were a sort of philosophers, who were exempt from all employment except the duty of studying physic, astrology, the foretelling of future events, the interpretation of dreams by augury, etc.¹

The Assyrians had different demons for different diseases—some injured the head, others attacked the hands and feet.²

The Assyrians believed that seven evil spirits might enter a man at the same time; and there is a tablet which tells of the protection afforded by a god against such demons. When the deity stands at the sick man's bedside, "those seven evil spirits he shall root out, and shall expel them from his body, and those seven shall never return to the sick man again."³

"Sometimes images of the gods were brought into the sick-room, and written texts from the holy books were put on the walls, and bound round the sick man's brains. Holy texts were spread out on each side of the threshold."⁴

In Mr. George Smith's *History of Assyria from the Monuments*, there is a translation of an Assyrian tablet from Assur-bani-pal's library. The tablet is on the charms to expel evil curses and spells. "It is supposed in it," says Mr. Smith, "that a man was under a curse, and Merodach, one of the gods, seeing him next to the god Hea, his father, enquired how to cure him. Hea, the god of wisdom, in answer related the ceremonies and incantations for effecting his recovery, and these are recorded in the tablet for the benefit of the faithful in after times.

TRANSLATION OF TABLET.

1. The evil curse like a demon fixes on a man
2. a raging voice over him is fixed
3. an evil voice over him is fixed
4. the evil curse is a great calamity
5. that man the evil curse slaughters like a lamb
6. his god from over him departs
7. his goddess stands angry at his side
8. the raging voice like a cloak covers him and bears him away
9. the god Merodach saw him and
10. to his father Hea into the house he entered and said
11. My father, the evil curse like a demon fixes on a man

¹ *Nineveh and its Palaces*, Joseph Bonomi, p. 164.

² *Records of the Past*, vol. iii. p. 140.

³ *Assyrian Talismans and Exorcisms*, trans. by H. F. Talbot. *Records of the Past*, vol. iii. p. 143.

⁴ *Folk Medicine*, p. 165.

49. the evil which in my body, my limbs and my teeth is fixed
50. like this fruit may it be crushed and
51. in this day may the burning flames consume,
52. may it drive out the spell and I shall be free
53. Thus : Like unto this branch which is split may be the spell,
54. in the burning flames it burns
55. its fibres to the trunk shall not return
56. to satisfy a wish it shall not come
57. — — — — —
58. the evil invocation, the finger pointing, the marking, the cursing,
the sinning.
59. the evil which in my body, my limbs and my teeth is fixed
60. like this branch may it be split and
61. in this day may the burning flames consume
62. may it drive out the spell and I shall be free
63. Thus : Like unto this wool which is torn may be the spell,
64. in the burning flames it burns
65. to the back of the sheep it shall not return
66. for the clothing of god and king it shall not be used
67. — — — — —
68. the evil invocation, the finger pointing, the marking, the cursing,
the sinning.
69. the evil which in my body, my limbs and my teeth is fixed
70. like this wool may it be torn and
71. in this day may the burning flames consume
72. may it drive out the spell and I shall be free
73. Thus : Like unto this flag which is torn may be the spell,
74. in the burning flames it burns
75. on to its mast it shall not return
76. to satisfy a wish it shall not come
77. — — — — —
78. the evil invocation, the finger pointing, the marking, the cursing,
the sinning.
79. the evil which in my body, my limbs and my teeth is fixed
80. like this flag may it be torn and
81. in this day may the burning flames consume
82. may it drive out the spell and I shall be free
83. Thus : Like unto this thread which is broken may be the spell,
84. in the burning flames it burns
85. the weaver into a cloak shall not weave it
86. for the clothing of god and king it shall not be used
87. — — — — —

88. the evil invocation, the finger pointing, the marking, the cursing,
the sinning.
89. the evil which in my body, my limbs and my teeth is fixed.
90. like this thread may it be broken and
91. in this day may the burning flames consume
92. may it drive out the spell and I shall be free.

The image of Hea placed in the doorway kept away the disease-demons.

In the Babylonian and Assyrian rooms of the British Museum there is a collection of bowls inscribed with charms in Chaldee, Syriac, and Mandaitic. It is supposed that they were used by sick persons, who drank their physic from them, trusting that it would thereby be more efficacious. As they drank they recited the formulæ and names of the archangels, Michael, Raphael, Ariel, Shaltiel, Malkiel, etc., which were inscribed upon them. The catalogue says that the earliest of these bowls were made about B.C. 200. Many are from Tell-Ibrahim (Cutha). It may be mentioned in this connection that Catholics frequently make the sign of the cross over medicinal potions before taking them.

The origin of the Sabbath as a day of cessation from all labour is evidently Accadian. In the following translation of an Assyrian tablet¹ we find the Sabbatarian principle in full force.

"The seventh day, feast of Merodach and Zir: Panibu, a great feast, a day of rest. The prince of the people will eat neither the flesh of birds nor cooked fruits. He will not change his clothing. He will put on no white robe. He will bring no offering. The king will not ascend into his chariot. He will not perform his duties as royal law-giver. In a garrison city the commander will permit no proclamations to his soldiers. The art of the physician will not be practised." This is another proof that the Jews derived many of their religious customs from the Assyrians and Accadians. The Assyrian Sabbath was evidently observed as strictly as under the Mosaic code. It is curious to note that the physician was not permitted to exercise his merciful calling on that day, and it throws light on the objection of the Jews to Christ that it was not lawful to heal on the Sabbath-day.

¹ From Baas' *Hist. Med.*, p. 28.

CHAPTER IV.

THE MEDICINE OF THE HINDUS.

The Aryans.—Hindu Philosophy.—The Vedas.—The Shastres of Charaka and Susruta.—Code of Menu.—The Brahmans.—Medical Practitioners.—Strabo on the Hindu Philosophers.—Charms.—Buddhism and Medicine.—Jíwaka, Buddha's Physician.—The Pulse.—Knowledge of Anatomy and Surgery in Ancient Times.—Surgical Instruments.—Decadence of Hindu Medical Science.—Goddesses of Disease.—Origin of Hospitals in India.

THE Hindus are considered by Max Müller to be much older even as regards their civilization than the Egyptians. This belief is based on his study of their language, which he says existed "before there was a single Greek statue, a single Babylonian bull, or a single Egyptian sphinx." According to him, the noble Indo-Germanic or Aryan people, from whom have descended the Bráhmaṇ, the Rájput, and the Englishman, had their earliest home, not in Hindustan, but in Central Asia. (Max Müller's theory is now superseded by anthropological researches so far as the Europeans are concerned.) This splendid race drove before them into the mountains or reduced to slavery the *Dasyus*, the obscure aborigines, the non-Aryan primæval peoples. The earliest Aryan poets composed the *Rig-Veda* at least three thousand, perhaps even four thousand years ago. The handsome Aryan fair-complexioned conquerors spoke with the utmost contempt of "the noseless" or "flat-nosed" Mongolian aborigines, who, in the Vedic poems, from being "gross feeders on flesh," "lawless," "non-sacrificing" tribes, were afterwards described as "monsters" and "demons."¹

It is necessary, if we wish to understand the principles of Hindu medicine, to glance at the philosophy and religion of the Brahmans and Buddhists. The Aryan conquerors descending through the Himalayas were a sober, industrious, courageous people, who lived a pastoral life, and knowing nothing of the enervating attractions of great cities, required no other medical treatment than simple folk medicine everywhere affords. Their earliest literature is found in the "Vedic Hymns," the "Sacred Books of the Hindus," which were composed by the wisest and best of the men, who were warriors and husbandmen, and

¹ See Taylor, *Origin of the Aryans*, chap. i.

the priests and physicians of their own households. They gradually acquired priestly supremacy over a wider range. Thus arose the Brahmans, the "Offerers of Potent Prayer." The *Rig-Veda* refers to physicians, and speaks of the healing power of medicinal herbs; and the *Atharva-Veda* contains an invocation against the fever-demon, so that medical matters began very early to receive attention after the conquest of Indian by the Aryans.

"Hinduism," says Professor Monier Williams, "is a creed which may be expressed by the two words, spiritual pantheism."¹ Of all beliefs this is the simplest. Nothing really exists but the One Universal Spirit; man's soul is identical with that Spirit. Separate existence apart from the Supreme is mere illusion; consequently every man's highest aim should be to get rid for ever of doing, having, and being, and strive to consider himself a part of the One Spirit. This in a few words is esoteric Hinduism. When we attempt to study the endless ramifications of the exoteric, or popular belief, the system, so far from being simple, is infinitely complicated. God may amuse Himself by illusory appearances. Light in the rainbow is one, but it manifests itself variously. All material objects, and the gods, demons, good and evil spirits, men, and animals are emanations from the One Universal Spirit; though temporarily they exist apart from him, they will all ultimately be reabsorbed into their source. In the Sanskrit language, which is the repository of *Veda*, or "knowledge," we have the vehicle of Hindu philosophy. The systems of Hindu philosophy which grew out of the third division of the *Vedas*, called the *Upanishads*, are six, and are given in Professor Monier Williams' work already referred to as—

1. The Nyāya, founded by Gotama.
2. The Vais'eshika, by Kanāda.
3. The Sāṅkhya, by Kapila.
4. The Yoga, by Pantanjali.
5. The Mimāṃsā, by Jaimini.
6. The Vedānta, by Bādarāyana or Vyāsa.

We know neither the dates of these systems, nor which of them preceded the other.

Oriental scholars tell us that, 500 years before Christ, in India, China, Greece, and Persia men began to formulate philosophical systems of religious belief, and to elaborate scientific ideas of the world in which they lived. Williams considers the *Vais'eshika* system of philosophy the most interesting of all the systems, from the parallels it offers to European philosophical ideas. This system goes more correctly than

¹ *Indian Wisdom*, p. xxvi.

the others into the qualities of all substances. It is therefore more scientific, as we should say. It is most interesting to discover how nearly the doctrine of the atoms approaches our Western teaching. The following is Professor Williams' account of these views :—

“First, then, as to the formation of the world, this is supposed to be effected by the aggregation of *Amus*, or ‘Atoms.’ These are innumerable and eternal, and are eternally aggregated, disintegrated, and re-integrated by the power of *Adrishta*. According to the *Kanādas Sūtras*, an atom is ‘something existing, having no cause, eternal.’ They are, moreover, described as less than the least, invisible, intangible, indivisible, imperceptible by the senses, and as having each of them a *Vi'sesha* or eternal essence of its own. The combination of these atoms is first into an aggregate of two, called *Duy-anuka*. Three of them, again, are supposed to combine into a *Trasa-renu*, which, like a mote in a sunbeam, has just magnitude enough to be perceptible.”¹

In the *Sāṅkhya* philosophy we find something very like Darwinism. “There cannot be the production of something out of nothing ; that which is not cannot be developed into that which is. The production of what does not already exist (potentially) is impossible, like a horn on a man ; because there must of necessity be a material out of which a product is developed ; and because everything cannot occur everywhere at all times ; and because anything possible must be produced from something competent to produce it.” (*Aphorisms*, i. 78, 114–117).²

The *Upa-Vedas*, or secondary *Vedas*, treat of various sciences, one of which, *Ayur-Veda*, is the “science of life,” or medicine. By some this is considered to belong to the *Atharva-Veda* ; by others to the *Rig-Veda*. By *Ayur-Veda* we are to understand something derived immediately from the gods. The supplementary revelation known as *Upa-Vedas* dates about 350 B.C., and there we find Brahmanical medicine already developing.³

“Of all ancient nations,” says Elphinstone, “the Egyptians are the one whom the Hindus seem most to have resembled.”⁴

There is good reason for believing that the ancient Greeks derived much of their philosophy and religion from the Egyptians, who seem in their turn to have taken both in great measure from India. Says Elphinstone : “It is impossible not to be struck with the identity of the topics discussed by the Hindu philosophers with those which engaged the attention of the same class in ancient Greece, and with

¹ *Indian Wisdom*, p. 84.

² *Ibid.*, p. 89.

³ *Asiatic Quarterly Review*, Oct., 1892, p. 287.

⁴ *Hist. India*, 4th ed., p. 48.

the similarity between the doctrines of schools subsisting in regions of the earth so remote from each other.”¹

Here we find the doctrines of the eternity of matter, the derivation of all souls from God and their return to Him, the doctrine of atoms and a whole system similar to that of Pythagoras. The Greek philosopher taught that intermediate between God and mankind are a host of aerial beings who exercise various influences on the condition of mankind and the affairs of the world. Enfield² and Stanley³ say that Pythagoras learned his doctrine from the Magi or Oriental philosophers.

Max Müller says that Zarathustra and his followers, the Zoroastrians, had been settled in India before they immigrated into Persia. “That the Zoroastrians and their ancestors started from India during the Vaidik period, can be proved as distinctly as that the inhabitants of Massilia started from Greece. . . . Many of the gods of the Zoroastrians come out . . . as mere reflections and deflections of the primitive and authentic gods of *Veda*.”⁴

The Hindus say that when their four immortal Vedas, named Rig, Yajur, Sáma, and Atharva, were originally given to man by Brahma, there was no disease or sin; but when mankind fell away from this virtuous and happy state, life was shortened and disease introduced. Brahma, in his compassion for the sufferings of mankind, then gave a second class of sacred books, the *Upavédas*; one of these, named *Ayur-Veda*, treats of the prevention and cure of diseases. Some say this work really came from Siva; it is the sacred medical authority of the Hindus, and is of the highest antiquity. It was originally of great length, but Brahma in mercy to mankind shortened it. Fragments now only remain, and these in the works of commentators. Two divisions treat of surgery. 1st, *Salya* treats of the surgery of the removal of foreign bodies, pus, and the dead child from the uterus; of healing wounds caused by knives, etc.; of bandaging, operations, blistering, and the treatment of abscesses and inflammations. 2nd, *Sáldkya* treats of diseases of the eyes, ears, mouth, and nose. 3rd, *Káyachikitsá* describes diseases affecting the whole body, as fevers, dysentery, etc. This section may be considered as constituting the practice of medicine. 4th, *Bhutavidya* deals with the art of restoring the deranged faculties of the mind produced by demoniacal possession, as by the anger of the gods, devils, giants, or spirits of dead men. They can only be removed by prayers, medicines, ablution, and offerings to the offended deity. 5th, *Kaumárabhritya* comprises the treatment of infants and such diseases as in them were caused by the displeasure of demons.

¹ *Hist. India*, 4th ed., p. 123.

² *Hist. Philos.*, vol. i. p. 394.

³ *School of Philos.*, p. 547.

⁴ Max Müller: *Zend-Avesta*, 83.

6th, *Agadatantra* is concerned with the administration of antidotes. 7th, *Rasdyanatantra* treats of the medicines proper for restoring youth, beauty, and happiness; it embraced chemistry or alchemy, and its intention was to discover the universal medicine. 8th, *Vajikarantantra* deals with the best means of increasing the human race: an illusory research, which, like the search for the elixir of life, has even in modern times occupied the attention of physicians. The sacred *Ayur-Veda* contained a description of the structure of the human body as learned from dissection, and a complete system of preventive and curative medicine.

In the Shastres (Charaka, Susruta), we learn that the *Ashwins*, or offspring of the Sun (Surja), were the physicians of the gods; they wrote books on medicine, and wrought wonderful cures. When the fifth head of Brahma was cut off by Bayraba, it was united again by the *Ashwins*, so skilled were they in surgery. They also cured the wounds which the gods received in the battle with the giants. They healed also the paralysed arm of Indra. When mankind became wicked, and consequently diseased, *Bharadwaja* went to Indra in heaven to acquire a knowledge of medicine, and the thousand-eyed god taught him the healing art. With this knowledge the sage *Bharadwaja* returned to earth, and taught the *Rishis* the principles he had acquired. So the sages learned to distinguish diseases and the medicines suitable for their cure; they lived to a very great age, writing books called by their own names. *Charaka* became the instructor of practitioners upon earth, and his is the most ancient and famous work on Hindu medicine. *Charaka*, whom we may term the Hindu Hippocrates, flourished at Benares, probably about B.C. 320. The most celebrated and ancient collection of Hindu laws and precepts is that which is known as "the Code of Menu," or "Institutes of Menu." It is probably the oldest and most sacred Sanskrit work after the Veda and its Sutras, and presents us with a faithful picture of the customs and institutions of the Hindus.

The Code of Menu lays it down that diseases are the consequences of sinful acts in previous states of existence. "Men of evil manners receive an alteration of form, some through evil (deeds) committed (by them) in this life, some also through (acts) formerly committed." A thief of gold (receives) the disease of bad nails; a drinker of intoxicating liquor (the disease of) black teeth; a slayer of a Brahman, consumption; he who violates the couch of the Guru, a skin disease; a slanderer, a foul-smelling nose; a false informer, a foul-smelling mouth; a stealer of grain, the loss of a limb, and one who mixes (grain) a superfluity (of limbs); one who takes food, dyspepsia; a thief of the voice, dumbness;

a thief of clothes, leprosy ; a horse-thief, lameness ; a stealer of a lamp would (in the next birth) become blind ; an extinguisher (of a lamp), one-eyed ; by (committing) injury (one would get) a condition of disease ; by not (committing) injury, the condition of not being diseased. Thus, according to the difference in their acts, (men who are) blamed by the good are born dull, dumb, blind, and deformed in appearance. Regularly, then, penance should be practised for purification, since those whose sins have not (thus) been done away with are (re)born with (these) disgraceful marks attached.”¹

Physicians are referred to several times in the *Ordinances of Menu*. In Lect. iv. 179 we are advised that “we should never have a dispute with a physician.” We are to avoid eating the “food of a physician and hunter, if a cruel man,” etc. (Lect. iv. 212). “The food of a physician is pus” (*Ibid.* 220). In Lect. ix. 284, “A fine (is set) for all physicians treating (a case) incorrectly : in (the case of creatures) not human (this is) the first, but in (the case of) human beings the medium (fine).”²

The Brahmans believed there was a remedy for every disease, in consequence of which they made a very careful examination of the vegetable kingdom, and so discovered a great number of medicines. If a medicine were efficacious in curing the patient, they invariably supposed it was due to the sanctity of the individual, and the divine pleasure which endowed him with it. It is therefore exceedingly difficult to obtain information, as it is believed that the medicine would lose its effect if the secret of the cure were divulged to others. From these selfish motives, the knowledge of the properties of many valuable remedies have been lost. Dr. Wise says, according to the Brahmans, there are nine secrets which should not be revealed to any one : these are the age of a person ; his wealth ; family occurrences ; his bad actions, or those which reflect shame or dishonour upon him ; his relations with his wife ; his prayers to his tutelar gods ; his charities ; and the virtues of nostrums, the ingredients of which are known to him.

Yet priests, says Baas, from the Brahman caste, and the sub-castes, the Vaisya and Vaidya, officiated for a long time as teachers of medicine

¹ *Ordinances of Menu*, Trübner's Oriental Series. Lect. xi. 48-54.

² The first fine is the lowest, *i.e.* two hundred and fifty *panas*. In the Atharvaveda also physicians are spoken of in disrespectful terms. “Various are the desires of men ; the wagoner longs for wood, the doctor for diseases.” A Brahman by the code of Menu was forbidden to follow the profession of a physician, as it was classed amongst those which were most impure.* At certain funeral ceremonies the same Code excluded such persons as “physicians, atheists, thieves, spirit drinkers, men with diseased nails or teeth, dancers, etc.”†

* Elphinstone, *Hist. of India*, 4th edition, p. 41.

† *Ordinances of Menu*, iii. 150-168.

and as physicians. The Vaidyas, as the higher of the two sub-castes, included the physicians proper; while the Vaisyas, or lower caste, furnished nurses.¹

When Buddhism passed into modern Hinduism (750-1000 A.D.) the rules of caste became stricter, and the old fetters were reimposed, and the Brahmans returned to their ancient principles which forbade them to contaminate themselves with blood or morbid matter; they withdrew from all practice of medicine, and left it entirely to the Vaidyas. After a time these also shrank from touching dead bodies. Then public hospitals were abolished when Buddhism fell. The Mohammedan conquests which began about 1000 A.D. introduced foreign practitioners of physic, who derived their knowledge from Arabic translations of Sanskrit medical classics and monopolised the patronage of the Mohammedan aristocracy.²

The only remains of the Buddhist hospitals now existing are the various institutions for animals, supported principally by the Jains, a sort of Protestants against Brahmanism.³

The Mohammedan medical practitioners were called "Hukeems," who followed the principles of Arabian medicine derived from Greek sources. As a rule these practitioners only attended on nobles and chiefs. There is no evidence even that the Mohammedan invaders employed medical men for their armies.⁴

Dr. Benjamin Heyne, in his *Tracts on India*, says,⁵—

"The medical works of the Hindus are neither to be regarded as miraculous productions of wisdom, nor as repositories of nonsense. Their practical principles, as far as I can judge, are very similar to our own; and even their theories may be reconciled with ours, if we make allowance for their ignorance of anatomy, and the imperfections of their physiological speculations."

In surgery they attained to high proficiency, and our modern surgeons have even been able to borrow from them the operation of rhinoplasty.⁶

Concerning the medicinal properties of minerals (stones and metals), plants, animal substances, and the chemical analysis and decomposition of these, we have also learned much that is extremely valuable from the Hindus. Their *Materia Medica* is so important, and has played so large a part in Western medical science, that we cannot afford to despise it, though the Hindus have contributed so little to the study of natural science.⁷ Veterinary medicine, so far as the diseases of

¹ Baas, *Hist. Med.*, p. 41.

² Hunter's *Indian Empire*, p. 109.

³ *Asiatic Quarterly Rev.*, Oct. 1892, p. 290.

⁴ *Ibid.*

⁵ Tract vi. p. 125.

⁶ Weber, *Hist. Ind. Lit.*, p. 270.

⁷ *Ibid.*

horses and elephants are concerned, has received special attention from the Hindus.

Charaka counsels youths who desire to study medicine to "seek a teacher whose precepts are sound and whose practical skill is generally approved, who is clever, dexterous, upright, and blameless; who knows also how to use his hands, has the requisite appliances, and all his senses about him; is confident with simple cases, and sure of his treatment in difficult ones; of genuine learning, unaffected, not morose or passionate, patient and kind to his pupils." The pupils should spring from a family of doctors, and should have lost none of their limbs and none of their senses. "They are to be taught to be chaste and temperate, to speak the truth, to obey their teacher in all things, and to wear a beard." They are advised to read medical treatises, attend to the personal instruction of their teacher, and to associate with other doctors. When the doctor visits his patient he should wear good clothes, incline his head, be thoughtful but of firm bearing, and observe all possible respect. Once within the house, word, thought, and attention should be directed to nothing else than the examination of the patient and all that concerns his case. He must not be a boaster. "Many recoil even from a man of skill if he loves to boast." As medicine is difficult to learn, the doctor must practise carefully and incessantly. He must seek every opportunity for conversation with a colleague. This will remove doubts, if he have them, and fortify his opinion.

When an operation is decided on, a fortunate moment, says Dr. Wise, is to be selected, and the Brahmans and the surgeons are to be "propitiated" with gifts. The operating room is to be clean and well lighted, milk, oil, herbs, hot and cold water are to be at hand, and strong attendants to hold the patient. The knife should be wet with water before being used. The sky must be clear, and the time should be near the new moon. The surgeon must be strong and a rapid operator, and he must neither perspire, shake, nor make exclamations. The palms of the hands and soles of the feet, vessels, tendons, joints, and bones are to be avoided. During the operation, care must be taken to keep a fire burning in the patient's room, on which sweet-scented substances are to be burnt, in order to prevent devils entering the patient by the wound made by the surgeon. After the operation holy water is to be sprinkled on the sufferer, and prayer addressed to Brahma. The bandages are to remain till the third day, and clean ones substituted.¹

Susruta was the son of *Visámitra*, a contemporary of Rama, and was

¹ Wise's *Hindu Medicine*, p. 184.

chosen by Dhanwantari, who was the Hindu Æsculapius, to abridge the Ayur-Veda for the cure of diseases and the preservation of the health, so that it might be more easily committed to memory. Susruta's book is still preserved, and after Charaka's it is the oldest book on medicine which the Hindus possess. Surgery was considered by Susruta to be "the first and best of the medical sciences; less liable than any other to the fallacies of conjectural and inferential practice; pure in itself, perpetual in its applicability; the worthy produce of heaven, and certain source of fame."

Wise says,¹ "Dhanwantari asked his pupils, On what shall I first lecture? They answered, On surgery; because formerly there were no diseases among the gods, and wounds were the first injuries which required treatment. Besides, the practice of surgery is more respected, as affording immediate relief, and is connected with the practice of medicine; although the latter has no connection with surgery." This was agreed to; and we find the explanation of the eight parts of Ayur-Veda, in six books of Susruta, as follows:—

1st. Surgery (Sútra Sthána), in which is considered the origin of medicine; the rules of teaching, the duty of practitioners, the selection and uses of instruments and medicines, the influence of the weather on health, and the practice to be followed after surgical operations. Then follows the description of the diseases of the humours and surgical diseases; the restoration of defective ears and noses; and the removal of extraneous substances which have entered the body; the different stages of inflammation, with their treatment; different forms of wounds and ulcers, and the regimen of patients labouring under surgical diseases; the description of good and bad diet; of prognosis; the kind of messengers to be employed by the sick; and of diseases produced by the deranged actions of the senses, and of incurable diseases. Then follows the preparations required for accompanying a rajah in war, the duty of practitioners, the difference of climates, the different classes of medicines according to their sensible qualities, a description of the fluids, and of the different preparations, and articles of food. These subjects are treated of in thirty-six chapters.

2nd. Nosology (Nidána Sthána). The description and diagnosis of diseases produced by vitiated humours, or derangements of blood, bile, wind, and phlegm; the symptoms and causes of rheumatic diseases, of piles, of stone, fistula-in-ano, leprosy, diabetes, gonorrhœa, and ascites; the symptoms of unnatural presentations in midwifery, large internal abscesses, erysipelas, scrofula, hydrocele, venereal diseases, and diseases of the mouth. These subjects are considered in sixteen chapters.

¹ *Hindu Medicine*, p. 8.

3rd. Anatomy (Saríra Sthána), or structure of the body. The description of the soul, and the elementary parts of the body ; of puberty ; of conception ; of the growth of the different parts of the body ; of bleeding ; of the treatment of pregnancy, and of infants. This division has ten chapters.

4th. Therapeutics (Chikitsa Sthána), in which the exhibition of medicines, the history of inflammations, the treatment of fractures, rheumatic diseases, piles, fistula-in-ano, leprosy, diabetes, and dropsy are given ; the manner of extracting the child in unusual positions, the remedies for restoring health and strength, and for prolonging life ; the means of preventing diseases ; the use of clysters, and of errhines, and the use of the smoke of different substances. These are considered in forty chapters.

5th. Toxicology (Kalpa Sthána). The means of distinguishing poisoned food, and descriptions of different mineral, vegetable, and animal poisons, with their antidotes, is given under this head. This division is treated of in eight chapters.

6th. The supplementary section, Locales (Uttara Sthána), includes various local diseases ; as those of the eye, nose, ears and head, with their treatment ; the symptoms and treatment of fever, and its varieties ; dysentery, consumption ; *gulma* ; diseases of the heart ; jaundice ; discharges of blood, and fainting. This is followed by the treatment of intoxication, of cough, hiccough, asthma, hoarseness of voice, worms, stercoraceous vomiting, cholera, dyspepsia, and dysuria. It also treats of madness, epilepsy, apoplexy ; the different tastes of substances, with their effects ; the means of retaining health, and the different opinions of practitioners regarding the humours. These subjects are treated in sixty-six chapters.

According to Susruta a pupil had to be initiated into the Science of Medicine. "A medical man should initiate a pupil who is either a Brahmana, Kshatriya, or Vaishya, the members of whose body are sound, of an amiable disposition, active, well-conducted, mild, healthy, vigorous, talented, courageous, of a retentive memory, good judgment and rank, whose tooth-ends, tongue, and lips are small, whose eyes, nose, and mouth are straight, of a pleasant mind, talk, and behaviour, and able to bear fatigue ; other such should not be initiated."

Many ceremonies follow ; an altar is to be erected having four angles in some conspicuous direction, which is to be washed with infusion of cow-dung and spread with kúsa grass ; precious stones and rice are to be scattered upon it, and a fire is to be kindled with a number of precious woods, an oblation of ghee is to be made, and the mystic words Bhúr Bhuvah Svar and Om are to be said. "After this hail

each divinity (Brahma, Agni, Dhanvantari, Prajapati, Asvins, and Indra) and each Sage (the Rishis), and make the pupil do the same."

Stenzler and others have thought it possible that Susruta borrowed his system of medicine largely from the Greeks, and they say that so far as chronology is affected by it there would be nothing surprising in the circumstance. But Weber asserts¹ that no grounds whatever exist for this supposition; on the contrary, there is much to tell against such an idea. None of the contemporaries of Susruta has a name with a foreign sound, and the cultivation of medicine is assigned by Susruta and other writers to the city of Benares. The weights and measures to be employed by the physician are those of the eastern provinces, which never came into close contact with the Greeks, and it was first in these parts where medicine received its special cultivation.

In the general treatment of disease, the Hindus paid great attention to diet, so as to promote the just balance of the elements and humours, as they considered that the generality of diseases are produced by derangements in the humours. Many of their statements on dietetics show a keen observation. If management of diet failed to cure the disorder, the patient was directed to abstain from food altogether for a time. Should this also fail, recourse was had to ejecting the corrupted humours by emetics, purgatives, or bleeding. Even the healthy were advised to take an emetic once a fortnight, a purgative once a month, and to be bled twice a year at the change of the seasons. The Hindus observed the "critical days" which have long been recognised by physicians everywhere. Pythagoras says the Egyptians observed them, and Hippocrates employed the term *κρᾶσις* when the humoral pathology was in vogue. The Hindus thought that all diseases divide naturally into two classes of the sthenic and asthenic types. In the one there was excess, in the other deficiency of excitement. Health consists in a happy medium. All the Asiatic nations hold this opinion. Their remedies consequently were stimulating or cooling, as the type of the malady demanded. Pepper, bitters, and purgatives were stimulants. Stomachics, as *chiraitā*, paun mixed with lime, bathing and cold were cooling remedies.²

The sages of antiquity have handed down to us the qualities which constitute a good physician. He must be strictly truthful, and of the greatest sobriety and decorum; he must have no dealings with any women but his own wife; he must be a man of sense and benevolence, of a charitable heart, and of a calm temper, constantly studying how to do good. Such a man is a good physician if, in addition to this, he constantly endeavours to improve his mind by the study of good books.

¹ *Hist. Ind. Lit.*, p. 268.

² Wise's *Hindu Medicine*, p. 213.

He is not to be peevish with an irritable patient ; he must be courageous and hopeful to the last day of his patient's life ; always frank, communicative, and impartial, he is yet to be rigid in seeing that his orders are carried out.

Hindu physicians make their prognosis a strong point in their practice ; there are, they say, certain signs which to the experienced eye enable the doctor to prognosticate the favourable or fatal termination of a disorder. And in the first place a good deal is to be learned from the messenger who summons him to the patient, and so he notes his appearance, his dress, his manner of speaking ; he notes the time of day and other circumstances, as these are all considered to have an influence on the result of the illness. It is considered unfavourable if many people follow each other to call the doctor. If the messenger sees a man arrive riding on an ass, or if he has a stick, string, or fruit in his hand, if he is dressed in red, black, or net clothes, if he sneezes, is deformed, agitated, crying, or scratching himself,—all these are bad signs. Not less so is it unfavourable when the physician is called at noonday or midnight, when he has his face turned towards the south, when he is eating, or when he is asleep or fatigued.¹

When the doctor arrives at the bedside, it is an unfavourable sign if the patient rubs one hand against another, scratches his back, or constantly moves his head. There are eight most severe forms of disease—the nervous class, tetanus and paralysis ; leprosy ; piles, fistula-in-ano, stone ; unnatural presentations in labour ; and dropsy of the abdomen. These are cured with great difficulty, say the Hindus.

It is a good sign when the patient's voice remains unaltered, when he awakes from sleep without starting, when he remains cool after food, and when he does not forget his god, but is prayerful and resigned.

“ When the messenger finds the physician sitting in a clean place, with his face towards the east, and the messenger has in his hands a water-pot full of water, with an umbrella, they are favourable signs.”

“ In Ceylon it is affirmed by the Shastree Brahmans that the Science of Medicine was communicated by *Māhā Brāhma* to the *Brāhma Dākshā Prajapati* ; by *Prajapati* it was communicated to the *Aswins* (the physicians of heaven) : the two *Aswins* communicated it to *Satorā*, the chief of the gods inhabiting the six lower heavens, by whom it was communicated to the nine sages, mentioned, on their going to him with one accord to seek a remedy for the evils brought upon mankind

¹ There would seem to be an artful idea under these signs. Most of them have no relation whatever to the patient's condition, but are of great importance to the doctor's convenience, and are evidently arranged to suit his own purposes.

by their iniquities ; they communicated it to the King of Casi (*Benares*), whose descendants caused it to be committed to writing.”¹

Arrianus, in his history of Alexander's expedition to India, says that “speckled snakes of a wonderful size and swiftness” are found in that country, and that “The Grecian physicians found no remedy against the bite of these snakes ; but the Indians cured those who happened to fall under that misfortune ; for which reason, Nearchus tells us, Alexander having all the most skilful Indians about his person, caused proclamation to be made throughout the camp that whoever was bit by one of these snakes, should forthwith repair to the royal pavilion for cure. These physicians also cure other diseases ; but as they have a very temperate clime, the inhabitants are not subject to many. However, if any among them feel themselves much indisposed, they apply themselves to their sophists, who by wonderful, and even more than human means, cure whatever will admit of it.”²

Strabo speaks of the Hindu philosophers or sages, and the physicians. “Of the Garmanes, the most honourable,” he says, “are the Hylobii, who live in the forests, and subsist on leaves and wild fruits ; they are clothed with garments made of the bark of trees, and abstain from commerce with women and from wine. The kings hold communication with them by messengers concerning the causes of things, and through them worship and supplicate the Divinity. Second in honour to the Hylobii are the physicians, for they apply philosophy to the study of the nature of man. They are of frugal habits, but do not live in the fields, and subsist upon rice and bread, which every one gives when asked, and receive them hospitably. They are able to cause persons to have a numerous offspring, and to have either male or female children, by means of charms. They cure diseases by diet, rather than by medicinal remedies. Among the latter, the most in repute are ointments and plasters. All others they suppose partake greatly of a noxious nature.”³ They had enchanters and diviners versed in the arts of magic, who went about the villages and towns begging.

Arrianus said of the Hindus that their women were deemed marriageable at seven years of age ; but the men, not till they arrive at the age of forty.⁴

Many charms, imprecations, and other superstitious usages of ancient India are contained in the *Atharva-veda-Samhitâ*. This body of literature dates, according to Max Müller, from 1000 to 800 B.C. (the *Mantra*

¹ Ainslie's *Materia Indica*, vol. ii. p. 525.

² Arrian's *Indian History*, vol. ii. p. 232 (ed. 1729).

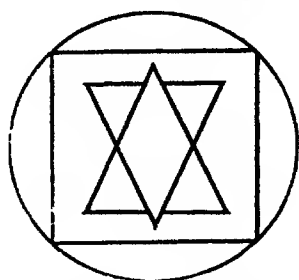
³ Strabo, *Geography*, Book xv. c. i.

⁴ *Indian History*, vol. ii. p. 219.

period).¹ In this Samhitâ a number of songs are addressed to illnesses, and the healing herbs appropriate for their cure. Sarpa-vidyâ (serpent-science) possibly dealt with medical matters also.²

The oldest fragments (very poor ones, it must be confessed) of Hindu medical science are to be found in these relics of Vedic times.

In a work on Indian medicine called the *Kalpastanum* described by Dr. Heyne,³ we read that the doctor's apparatus of mortars, scales, etc., must be kept in a place in the wall that has been consecrated for that purpose by religious ceremonies. In the middle of the medicine room the mystic sign must be set up, with images of Brahma, Vishnu, and Siva.



Many ceremonies must be gone through in the preparation of medicines ; the physician must attend to the boiling of some of them himself, and the spot round the fireplace must be smeared with cow-dung by a virgin, or by the mother of sons whose husband is alive ; at the same time, offerings must be made to the gods. Should any of the ceremonies be omitted, the patient will repent the neglect, for devils of all descriptions will defile the medicine and hinder its good effect. Before the patient takes his potion, the god of physic is to be worshipped in the person of his deputy, the doctor, who naturally (and for the good of the patient) is to be well rewarded for his services.

Buddhism, says Max Müller, is the frontier between ancient and modern literature in India. He gives 477 B.C. as the probable date of Buddha's death,⁴ and describes the religion of that great sage as standing in the same relation to the ancient Brahmanism of the Veda as Italian to Latin, or as Protestantism to Catholicism. It is a development from Brahmanism, yet it is not the religion of India, though it has greatly influenced Hindu thought.⁵

Buddha's religious system recognised no supreme deity ; a Buddhist never really prays, he merely contemplates.⁶

Man can himself become the only god Buddha's system finds room for. God becomes man in Brahmanism ; man becomes a god in Bud-

¹ *Hibbert Lectures*, 1878, p. 150.

² Weber, *Sanskrit Literature*, p. 265.

³ *Tracts on India*, p. 139.

⁴ *Hibbert Lectures*, 1878, p. 134.

⁵ Monier Williams, *Indian Wisdom*, p. 56.

⁶ *Ibid.*, p. 57.

dhism. All existence is an evil to the Buddhist; "act" is to be got rid of as effectually as possible, for action means existence. The great end of the system is *Nirvāna*, or non-existence. "Of priests and clergy in our sense," says Professor Williams, "the Buddhist religion has none." Though there is no God, prayer is practised as a kind of charm against diseases; for malignant demons, as we might have expected, are believed by Buddhists to cause these and other evils. These Buddhist prayers are used like the Mantras of the Brahmins as charms against evils of all kinds. The Buddhists have a demon of love, anger, evil, and death, called *Māra*, the opponent of Buddha. He can send forth legions of evil demons like himself. Some of the precepts of Buddha are fully equal to those of the highest religions—Charity, Virtue, Patience, Fortitude, Meditation, and Knowledge. The special characteristic of Buddhism is the perfection of its tenderness and mercy towards all living creatures, even beasts of prey and noxious insects not being outside the circle of its sympathy. According to the Buddhist's belief, all our acts ripen and go to form our Karma. The consequences of our acts must inexorably be worked out. This is Brahminical as well as Buddhistic doctrine. "In the *Sābda-kalpa-druma*, under the head of *Karma-vipāka*," says Williams, "will be found a long catalogue of the various diseases with which men are born, as the fruit of evil deeds committed in former states of existence, and a declaration as to the number of births through which each disease will be protracted, unless expiations be performed in the present life."¹

All our sufferings, our sicknesses, weaknesses, and moral depravity are simply the consequences of our actions in former bodies. When the Jews asked our Lord, "Who did sin, this man (*i.e.* in a former life) or his parents, that he was born blind?"² they evidently had in their minds the Hindu doctrine of previous existences. The principles of the Brahminic religion do not appear to have embraced any care for or attention to the needs of sick people. Involved in philosophical speculations, and the perfecting of their system of caste, the founders of the Brahminic religion had no time to bestow on such mundane matters as disease and its cure. It was not until the rise of Buddhism and the political ascendancy which it acquired over Brahmanism (from about 250 B.C. to A.D. 600), that public hospitals were established for man and animals in the great cities of the Buddhist princes.³ Buddhism had a gospel for every living creature; it taught the spiritual equality of all men, whose good works, without the mediation of priests and Brahmins, would save them from future punishment. Medicine, under the

¹ *Indian Wisdom*, p. 66.

² John ix. 2.

³ *Asiatic Quarterly Review*, Oct. 1892, p. 288.

fostering care of Buddhism, was studied as any other science, and the noblest outcome of the movement was the establishment of public hospitals. A great seat of medical learning was established at Benares, and Asoka, King of Behar or Putra, published fourteen Edicts, one of which devised a system of medical care for man and beast.¹

Amongst the legends of Gotama Buddha is the history of Jíwaka, which is of great interest to the historians of medicine, as it illustrates the state of the science in India at that early age. The following account is abbreviated from Mr. Spence Hardy's translation of Singhalese MSS.²

Jíwaka was a physician who administered medicine to Budha. He learned his profession in this way. When he was seven or eight years of age, he ran away from his parents, resolving that he would learn some science; so he considered the character of the eighteen sciences and the sixty-four arts, and determined that he would study the art of medicine, that he might be called doctor, and be respected, and attain to eminence. So he went to the collegiate city of Taksalá³ and applied to a learned professor to take him into his school of medicine. The professor asked him what fees he had brought with him. Jíwaka said he had no money, but he was willing to work. The professor liked the manner of the lad, and agreed to teach him, though from other pupils he received a thousand masurans. At this moment the throne of Sekra trembled, as Jíwaka had been acquiring merit, and was soon to administer medicine to Gotama Budha. The déwa resolved that as he was to become the physician of Budha, he would himself be his teacher; and for this purpose he came to the earth, entered the mouth of the professor, and inspired him with the wisdom he needed to teach his pupil in the most excellent manner.

Jíwaka made rapid progress, and soon discovered that he could treat the patients more successfully than his master. He learned in seven years as much about diseases as any other teacher could have taught him in sixteen. Then Jíwaka asked his preceptor when his education would be finished; and the old man, wishing to test his knowledge, told him to take a basket and go outside the city for the space of sixteen miles, and collect all the roots, barks, leaves, and fruits which were useless in the art of medicine. Jíwaka did as he was instructed, and after four days he returned and informed the professor that he had met with no substance which in some way or other was not useful in medicine; there was no such thing on earth. Now when the teacher heard this reply, he said, there was no one who could teach the pupil any more,

¹ *Asiatic Quarterly Review*, Oct. 1892, p. 288. ² *A Manual of Buddhism*, pp. 238.

³ Probably the Taxila of the Greeks. See Strabo, Book xv. c. 1, § 61.

and Sekra departed from his mouth. He knew that his pupil had been taught by divine wisdom. Then Jíwaka journeyed to Sákétu, where he found a woman who had a violent pain in her head, which for seven years many learned physicians had vainly tried to cure. He offered to cure her, but she said, "If all the learned doctors had failed to relieve her, it was useless to seek the aid of a little child." Jíwaka replied that "Science is neither old nor young. I will not go away till the headache is entirely cured." Then the woman said, "My son, give me relief for a single day : it is seven years since I was able to sleep." So Jíwaka poured a little medicine into her nose, which went into her brain, and behold, all her headache was gone ; and the lady and her relations each gave the physician 4,000 nílā-karshas, with chariots, and other, and other gifts in abundance. After this he cured the king of a fistula-in-ano, for which he received a royal reward. There was in Rajagaha a rich nobleman who had a pain in his head like the cutting of a knife. None of his physicians could cure him, so Jíwaka took the noble into a room, sat behind him, and taking a very sharp instrument, opened his skull ; and setting aside the three sutures, he seized the two worms which were gnawing his brain with a forceps, and extracted them entire. He then closed up the wound in such a manner that not a single hair was displaced. There was a nobleman in Benares who had twisted one of his intestines into a knot, so that he was not able to pass any solid food. Crowds of physicians came to see him, but none of them dare undertake his case ; but Jíwaka said at once he could cure him. He bound his patient to a pillar that he might not move, covered his face, and taking a sharp instrument, without the noble's being aware of what was going on, ripped open the abdomen, took out his intestines, undid the knot, and replaced them in a proper manner. He then rubbed ointment on the place, put the patient to bed, fed him on rice-gruel, and in three days he was as well as ever. Of course he had an immense fee. After performing other wonderful cures, Jíwaka administered medicine to Budha in the perfume of a flower. The narrative must be given in the words of the MS. : "In this way was the medicine given. On a certain occasion when Budha was sick, it was thought that if he were to take a little opening medicine he would be better ; and accordingly Ananda went to Jíwaka to inform him that the teacher of the world was indisposed. On receiving this information, Jíwaka, who thought that the time to which he had so long looked forward had arrived, went to the wihára, as Budha was at that time residing near Rajagaha. After making the proper inquiries, he discovered that there were three causes of the disease ; and in order to remove them he prepared three lotus flowers, into each of which he put a quantity of medi-

cine. The flowers were given to Budha at three separate times, and by smelling at them his bowels were moved ten times by each flower. By means of the first flower the first cause of disease passed away, and by the other two the second and third causes were removed."

This legend is instructive in many ways. It shows us that 500 B.C. there were colleges in which medicine was taught, and that by special professors of the art, who received large fees from their pupils and kept them under instruction for many years. We find that the profession of medicine brought great honours and rewards to its adepts. We learn that trephining the skull for cerebral diseases was in use, and that the operation of opening the abdomen for bowel obstructions was understood. It reveals the important fact that already the whole of nature had been ransacked for remedies, and that everything was more or less useful to the physician. The great efficacy which the ancients attributed to perfumes is exhibited in the lotus story, which reminds us that when Democritus was aware that he was dying, he desired to prolong his life beyond the festival of Ceres, and accomplished his wish by inhaling the vapour of hot bread.

Galen's description of the pulse in disease is very suggestive of the ancient Sanskrit treatises on the pulse; so much is this the case, it would seem, that either the Hindu physician must have copied from the Roman, or the Roman from the Indian. He speaks of the *sharp-tailed* or *myuri*, *fainting myuri*, *recurrent myuri*, the *goat-leap* or *dorcadissans*, a term derived from the animal *dorcas*, which, in jumping aloft, stops in the air, and then unexpectedly takes another and a swifter spring than the former. But if after the diastole it recur, and before a complete systole take place, strike the finger a second time; such a pulse is called a *reverberating* one, or *dicrotos*, from its beating twice. There is also the *undulatory* and *vermicular* pulse, the *spasmodic* and *vibratory*, the *ant-like* or *formicans*, from its resemblance to the ant (*formica*), on account of its smallness and kind of motion; there is the *hectic*, the *serrated*, the *fat* and the *lean* kind.

Medical etiquette amongst the Hindus was not overlooked.

"A physician who desires success in his practice, his own profit, a good name, and finally a place in heaven, must pray daily for all living creatures, first of the Brahmans and of the cow. The physician should wear his hair short, keep his nails clean¹ and cut close, and wear a sweet-smelling dress. He should never leave the house without a cane or umbrella; he should avoid especially any familiarity with women. Let his speech be soft, clear, pleasant. Transactions in the house should not be bruited abroad."²

¹ A doctrine re-discovered by our bacteriologists.

² Haeser.

The dissection and examination of the dead subject is not practised in India, it is contrary to the tenets of the Brahmans ; such knowledge of anatomy as the Hindus possess must therefore be little else than conjecture, formed by the study of the bodies of animals. Ainslie says¹ that the Rajah of Tanjore, in the year 1826, was a learned and enlightened prince, who was anxious to study the structure of the human body, but was too rigid a Hindu to satisfy his curiosity at the expense of his principles, so he ordered a complete skeleton made of ivory to be sent to him from England. Sir William Jones states that in a fragment of the *Ayur-Veda* he was surprised to find an account of the internal structure of the human frame.²

The ancient Hindus must have possessed considerable knowledge of surgery. In a commentary on Susruta made by Ubhatta, a Cashmirian, which may be as old, Ainslie thinks, as the twelfth century, many valuable surgical definitions are distinctly detailed. According to the best authorities, says Ainslie, surgery was of eight kinds: *chedhana*, cutting or excision; *lekha*, or scarification and inoculation; *vyadhana*, puncturing; *eshyam*, probing or sounding; *aharya*, extraction of solid bodies; *visravana*, extracting fluids (by leeches and bleeding); *sevana*, or sewing; and *bhedana*, division or excision.³

Twelve species of leeches are enumerated in some of the Sanskrit works on surgery, six of which are poisonous and six useful medicinally.⁴

Dissection was practised in the most ancient times; but now there is the greatest prejudice against touching the dead body, and modern practitioners of Hindu medicine, where they do not follow the ancient authors, are in a worse condition than they were, on account of the present ignorance of anatomy. All the sages are alleged to have learned their knowledge of medicine from the works of Charaka and Susruta. Those who were taught by Charaka became physicians; those who were followers of Susruta, surgeons. Charaka's classification and plan of treating diseases are considered superior to those of Susruta, but the latter is prized for his anatomy and surgery. Babhata compiled a compendium of medicine from the works of these great masters of the art, and some three hundred years ago a compilation was made from all the most celebrated works on medicine; this was called *Baboprukasa*. It is clear and well arranged, and explains the difficulties and obscurities of the ancient Shastres. This was compiled as a text-book for practitioners, and is in high repute with them. Dr. Wise explains the ancient methods of dissecting the human body as given in Hindu text-books.

¹ *Materia Indica*, vol. ii. p. vii.

² *Ibid.*

³ *Ibid.*, p. viii.

⁴ *Oriental Magazine*, March, 1823.

"The dejections are to be removed, and the body washed and placed in a framework of wood, properly secured by means of grass, hemp, sugar-cane reeds, corn-straw, pea-stalks, or the like. The body is then to be placed in still water, in a moving stream, where it will not be injured by birds, fish, or animals. It is to remain for seven days and nights in the water, when it will have become putrid. It is then to be removed to a convenient situation, and with a brush, made of reeds, hair, or bamboo bark, the surface of the body is to be removed so as to exhibit the skin, flesh, etc., which are each in their turn to be observed before being removed. In this manner, the different corporeal parts of the body will be exhibited; but the life of the body is too ethereal to be distinguished by this process, and its properties must therefore be learned with the assistance of the explanations of holy medical practitioners, and prayers offered up to God, by which, conjoined with the exercise of the reasoning and understanding faculties, conviction will be certainly obtained."¹

The Hindus have been great observers of the natural qualities of plants, though they have contributed little or nothing to the study of botany. "The *materia medica* of the Hindus," says Hunter,² "embraces a vast collection of drugs belonging to the mineral, vegetable, and animal kingdoms, many of which have been adopted by European physicians." They were ingenious pharmacists, and some of their directions for the administration of medicines are most elaborate. They paid scrupulous attention to hygiene, regimen, and diet.

Hindu treatises on medicine inform the physician that man's constitution is occasioned by three dispositions born with him—*wadum*, *pittum*, and *chestum*, or wind, bile, and slime,—and it is the physician's business to ascertain which of these predominate in any individual. These we may call the three morbid diatheses. The pulse is to be felt, not merely at the wrist as we feel it, but in ten different parts of the body. Some of the descriptions of the pulse are very curious. Sometimes, they say, it beats as a frog jumps, or as a creeping rain-worm, or like the motion of a child in a cradle hung in chains; at other times it is like a fowl when running or as a peacock when strutting, and so on.

The Yantras or surgical implements known to Susruta were, according to Professor H. H. Wilson, one hundred and one, and are thus described by him in his most interesting paper on the "Medical and Surgical Sciences of the Hindus."³

The instruments were classed as Swastikas, Sandansás, Tálayantras, Nádiyántras, Śalákás, and Upayantras.

¹ Wise, *Hist. Hind. Med.*, vol. i. pp. 131, 132. ² *Indian Empire*, p. 106.

³ *Oriental Magazine*, vol. i. (1823), pp. 349-356.

The *Swastikas* are twenty-four in number ; they are metallic, about eighteen inches long, and fancifully shaped like the beaks of birds, etc. They were a sort of pincers or forceps.

The *Sandanās* were a kind of tongs for removing extraneous substances from the soft parts.

The *Tālayantras* were similar, and were used for bringing away foreign bodies from the ears, nose, etc.

The *Nddiyantras* were tubular instruments, of which there were twenty sorts. They were similar to our catheters, syringes, etc. The *Salākās* were rods and sounds, etc. Of these there were twenty-eight kinds ; some were for removing nasal polypi, so common and so troublesome in India. The *Upayantras* were such dressings as cloth, twine, leather, etc. The first, best, and most important of all implements is declared to be the *Hand*. The *Man'dalāgra* was a round pointed lancet ; the *Vriddhipatra* a broad knife ; the *Arddhadhārās* are perhaps knives with one edge ; the *Trikūrchaka* may be a sort of canular trochar, with a guarded point. The *Vrihinnukha* is a perforating instrument. The *Kuthūrikā* was probably a bistoury. The *Vadiśa* is a hooked or curved instrument for extracting foreign substances, and the *Dantaśanku* appears to be an instrument for drawing teeth. The *Arā* and *Karapatra* are saws, for cutting through bones. The *Eshan'i* is a blunt straight instrument six or eight inches long—a sort of probe, in fact. The *Sūchi* is a needle. Then the Hindu surgeon had substitutes such as rough leaves that draw blood, pith of trees, skin, leeches, caustics, etc. It is evident that the surgeon of ancient India was not inefficiently armed.

The student of surgery had many curious contrivances for acquiring manual dexterity. He practised the art of making incisions on wax spread out on a board ; on flowers, bulbs, and gourds. Skins or bladders filled with paste and mire were used for the same purpose. He practised scarification on the fresh hides of animals from which the hair has not been removed ; puncturing, or lancing the vessels of dead animals ; extraction on the cavities of the same, or fruits with large seeds ; sutures were made on skin and leather, and ligatures and bandages on well-made models of the human limbs. Fourteen kinds of bandages are described by Vāgbhatta. The cautery was applied by hot seeds, burning substances, or heated plates and probes. Frequently this treatment was used for headaches and for liver and spleen disorders. It was chiefly employed, however, as with the Greeks, for averting bleeding by searing the mouths of the divided vessels. The early Hindus could extract stone from the bladder, and even the foetus from the uterus. They must have been bold operators, many of their

operations being actually hazardous. It is a subject deserving of inquiry how they lost the information and skill which they once possessed in so high a degree. The books of medicine and surgery to which reference has been made are undoubtedly most ancient, and it must be remembered were considered as inspired writings. Professor Wilson says: "We must infer that the existing sentiments of the Hindus are of modern date, growing out of an altered state of society, and unsupported by their oldest and most authentic civil and moral, as well as medical institutes."

Many surgical operations which we consider triumphs of our modern practice were invented by the ancient Hindus. They were skilled in amputation, in lithotomy (as we have seen), in abdominal and uterine operations; they operated for hernia, fistula, and piles, set broken bones, and had specialists in rhinoplasty or operations for restoring lost ears and noses. It was a common custom in India for a jealous husband to mutilate the nose of his suspected wife, so that surgeons had opportunities to practise this branch of their art. The ancient Indian surgeons invented an operation for neuralgia which was very similar to the modern division of the fifth nerve above the eyebrow. Veterinary science was understood, and ancient treatises exist, says Hunter,¹ on the diseases of elephants and horses.

The best era of Hindu medicine was from 250 B.C. to 750 A.D. Its chief centres were found in such Buddhist monastic universities as that of Nalanda, near Gayá.² Hunter thinks it probable that the ancient Bráhmans may have derived their anatomical knowledge from the dissection of the sacrifices; but there is no doubt that the true schools of Indian medicine were the great public hospitals which were established by Buddhist princes like Asoka, famous for his rock edicts, B.C. 251-249. Amongst the fourteen injunctions inscribed by this enlightened sovereign, the first was the prohibition of the slaughter of animals for food or sacrifice, and the second was the provision of a system of medical aid for men and animals and of plantations and wells on the roadside.³

Probably King Asoka's were the first real hospitals for general diseases anywhere established, as the institutions connected with the Greek temples were not exactly hospitals in our sense of the term; they were more like camps round a mineral spring or spa. The Buddhist physicians would have in these merciful institutions abundant opportunity for the continuous study of disease.

Whatever may have been the condition of ancient Hindu anatomy and surgery, in modern times both have now fallen to the lowest point.

¹ *Indian Empire*, p. 108.

² *Ibid.*

³ *Ibid.*, p. 146.

Dislocated joints are replaced and fractured limbs set by a class of men similar to our bone-setters which are found in all nations. Certain of the Mohammedan doctors—*Hakeems*—sometimes bleed and couch for cataract in a clumsy manner. The village *Kabirdj* knows but a few sentences of Sanskrit texts, but he has “a by no means contemptible pharmacopœia,” says Hunter. The rest consists of spells, fasts, and quackery.

Physicians (*Vitians* or *Vydias*) being Sudras are not allowed to read the sacred medical writings (Vedas); these are guarded with religious awe by the Brahmins; they are permitted, however, access to certain commentaries upon the professional sacred books.

When we reflect on the high position which the science and art of the Hindus had attained in very ancient times, it is surprising that we have apparently learned little or nothing from them in connection with the healing art. Max Müller believes that there was an ancient indigenous Hindu astronomy and an ancient indigenous Hindu geometry. Probably the first attempt at solving the problem of the squaring of the circle was suggested, he thinks, by the problem in the *Sûtras* how to construct a square altar that should be of exactly the same magnitude as a round altar. It is scarcely conceivable that so patient and shrewd a people as the Hindus, a people at once so observant and so profoundly speculative, should not have kept pace with the other enlightened nations of the world in the study of medicine and surgery. The vegetation of India is so rich in medicinal herbs that its *Materia Medica* could hardly be equalled in any other country; so that both by intellect and by location the Hindus should be amongst the foremost professors of the art of medicine. On the contrary, however, the West has everywhere to instruct the East in the medical sciences; and the young Brahmins who flock to the medical schools and universities of Europe find that they have everything to learn from us in this direction. Is this an evidence of arrested development, a retrogression in civilization due to conservatism and a paralysis of the power to keep pace with the world's advance consequent on the influences of religion and custom? Probably it is. All the medicine of the Hindus is empiricism; their systems exclude anatomy and surgery, without which, as Prof. H. H. Wilson observes,¹ “the whole system must be defective. . . . We can easily imagine that these were not likely to have been much cultivated in Hindustan, and that local disadvantages and religious prejudices might have proved very serious impediments to their acquirement.”

As compared with other ancient nations, Egypt, Chaldæa, Greece, and Rome, we are at considerable disadvantage in the attempt to dis-

¹ *Medical and Surgical Sciences of the Hindus.*

cover what was known and practised of the healing arts in the remoter ages. We have no papyri like the "Book of the Dead" or the great medical papyrus of Ebers; we have no inscriptions on such ancient monuments as Mesopotamia has preserved for us; we have no Sanskrit treatises to be compared for their antiquity and scientific interest with those which have come down to us from ancient Greece.

Max Müller says¹ that "few Sanskrit MSS. in India are older than 1000 after Christ, nor is there any evidence that the art of writing was known in India much before the beginning of Buddhism, or the very end of the ancient Vedic literature."

Then, again, the Hindu treatises on medical subjects, whether fables or facts, have hitherto been little noticed by Sanskrit scholars.²

The subject is not of general interest, and a man would need to be not only a perfect Sanskrit scholar, but a physician as well, who should attempt such a task as the translation of these treatises in any useful manner. Although ancient India has little to show us in the way of actual written documents and inscriptions, it must not be supposed for a moment that she is deficient in ancient poetry and other works which have been preserved through the ages by the marvellously developed memory of her Brahmins and religious teachers. The ancient Vedic hymns, the Brâhmanas, and probably the Sûtras, were handed down from before 1000 B.C. by oral tradition. Every, the minutest precaution was taken that not a word, not a letter, not an accent even should be omitted or altered; and Max Müller tells us "this was a sacred duty, the neglect of which entailed social degradation, and the most minute rules were laid down as to the mnemonic system that had to be followed."

The people of India believe that small-pox is under the control of "the goddess Mata," in whose honour temples abound and fairs are held, where thousands of women and children attend with offerings. The declivities of most of the numerous conical hills present either a reddened stone or temple devoted to "Mata," with most probably an attendant Brahmin priest. Nearly every village has its goddess of small-pox in the immediate locality, and in many places a large piece of ground is esteemed holy and dedicated to "Mata." The people do not pray to escape the affection, unless in seasons when it occurs with more than ordinary violence. They do, however, petition for a mild visitation. But even the loss of an eye does not appear to be viewed as a very serious calamity! "Is there not another eye sufficient for all our purposes?" questioned one of these stoical philosophers.

¹ *Hibbert Lectures*, 1878, p. 153.

² Prof. H. H. Wilson's *Medical and Surgical Sciences of the Hindus*.

"If it were the leg or hand, it would be different, but an eye is immaterial." ¹

"The small-pox goddess stands with two uplifted crooked daggers, threatening to strike on the right and left. Before her are a band of executors of her vengeance. Two of them wear red grinning masks, carry black shields, and brandish naked scimitars. White lines, like rays, issue from the bodies of the others, to indicate infection. On the right there is a group of men with spotted bodies, afflicted with the malady; bells are hung at their cinctures, and a few of them wave in their hands black feathers. They are preceded by musicians with drums, who are supplicating the pity of the furious deity. Behind the goddess, on the right, there advances a bevy of smiling young women, who are carrying gracefully on their heads baskets with thanksgiving-offerings, in gratitude for their lives and their beauty having been spared. There is, besides, a little boy with a bell at his girdle, who seems to be conveying something from the right arm of the goddess. This action may possibly be emblematic of inoculation." ²

Another small-pox deity of India described by Mr. Dubois, a missionary, ³ is Mah-ry-Umma, who is supposed to incarnate herself in the disease. The natives, when vaccination was first introduced, objected to the practice for fear lest the goddess should be offended, as to prevent the small-pox would imply an objection to her becoming incarnate amongst them. The difficulty was overcome by the suggestion that the vaccination was a mild form of disease by which the goddess had chosen to visit her votaries, so that she might be worshipped with equal respect.

"Even Siva is worshipped as a stone, especially that Siva who will afflict a child with epileptic fits, and then, speaking by its voice, will announce that he is Parchânana, the Five-faced, and is punishing the child for insulting his image." ⁴

Surgeon-General Sir W. J. Moore, in an article on "The Origin and Progress of Hospitals in India," ⁵ says that we may form a very good opinion of the condition of the whole of India in ancient times by recalling what was the state of medical relief in most of the native States previous to the institution of medical relief and sanitation in British districts.

"Recently, in the Native States, there might be witnessed disease

¹ *Brit. Med. Journ.*, June 25, 1892, p. 1382.

² Moore, *History of the Small-pox*, p. 33, quoted in Pettigrew's *Medical Superstitions*, p. 81.

³ Paris's *Pharmacologia*, p. 26.

⁴ Tylor, *Primitive Culture*, vol. ii. p. 150.

⁵ *Asiatic Quarterly Rev.*, Oct. 1892, p. 291.

proceeding unchecked and uninterfered with, to a degree which certainly would not be allowed at present in civilized Europe. And especially was this evident in surgical disease, as illustrated by the following extract from an official document:¹—

“In former reports I have mentioned the extreme ignorance displayed by native “hukeems” or “vaid” of surgical principles. As a rule, all surgical disease is either wrongly treated, or let alone until treatment is unavailable by these uneducated practitioners. Their errors of omission and commission are not so easily ascertained in their medical, as in their surgical, practice. But in the latter, there is a glaring ignorance, not only from things requisite not being attempted, but from things unnecessary being performed, leading to the serious injury and often to the death of the patient. Thus, during my last tour, I saw at one village, an open scrofulous sore of the neck with the carotid artery isolated, and apparently on the point of giving way. At another village I witnessed an advanced cancer rapidly killing a man. In another place a woman had remained for days with a dislocated jaw, which was easily put *in situ*. Other forms of dislocation and fracture neglected are almost daily sights. At Bikaneer I amputated the leg of a man who eight months before fell from a camel; the bones of the leg protruding through the skin of the heel, and the foot being driven half-way up the front of the leg, *in which position it had been permitted to heal!* At the same place a woman was rapidly sinking from the results of extensive sinus of the breast, following abscess, and which only required free incisions for the restoration of health. I also saw a man dying of strangulated hernia, without the slightest idea of or attempt at relief on the part of the native practitioners. And so on, throughout almost the whole range of surgery, I have from time to time witnessed the most lamentable results from the malpractices, or from the absence of practice on the part of the Native Doctors.’

“As mentioned in the above extract, the errors of omission and commission are not so easily ascertained in medical as in surgical cases. But the great majority of those stricken by disease, such as inflammations and fevers, derived as little benefit from medicine as did the Romans when, according to Pliny, physicians were banished from the Imperial City during many years. For few indeed of the higher class and comparatively better educated ‘hukeems’ or ‘vaid’ would minister to the poor who were unable to pay their fees; and of the

¹ Selections from the Records of the Government of India. Foreign Department. No. CVIII. Rajputana Dispensary, Vaccination, Jail, and Sanitary Report for 1872-73. By Surgeon-Major (now Surgeon-General Sir W.) Moore, C.I.E., Honorary Surgeon to the Viceroy of India.

populations of India the great majority are and always were poor. Steeped in continually augmenting superstition and ignorance, if the poor received medical aid at all, it was from the hands of the equally ignorant and superstitious village 'Kabiraj,' who, unlike their more noble Aryan predecessors, did not even 'draw physic from the fields,' although they may have used a charm, such as a peacock's feather tied round the affected part ! If the poor got well, they got well ; and as most diseases have a tendency to terminate in health, many did recover. If a fatal termination resulted, it was attributed to *nusseeb* or destiny, or the gods were blamed. Insane persons, if harmless, were allowed to ramble about the streets ; if violent, they were chained in the most convenient place. The jails of the Native States were also in an unparalleled unsanitary condition, for no medical aid whatever was provided ; as Coleridge said of Coldbath Fields, these jails might have given His Satanic Majesty a hint for improving Hades. Fatalism combined with ignorance, and a consequent utter unbelief in any measures of sanitation, resulted in the absence of all measures of precaution during epidemics of contagious disease. During the prevalence of small-pox, children might be seen by scores, in every stage of the disease, playing or lying about the streets. During an epidemic of cholera, not one precautionary measure was ever adopted—except by the wild Bheels, who invariably moved, leaving their villages for a time for the open jungle ; thus forestalling the most approved method of preventing cholera adopted for British troops, viz., marching away from the infected area.

"Not only were there no hospitals proper, or contagious hospitals, or asylums for the insane, but neither were there any asylums for lepers. Regarding the latter, difference of opinion would appear to have existed among scientific investigators, then as now, as to whether leprosy is a contagious disease or not. Then as now, in some parts of the country, lepers were permitted to live among the people ; in other localities they were thrust out from the towns or villages, generally forming a little colony on the adjoining plain. This expulsion of lepers from the towns and villages, then as now, was not so much the result of fear of contagion, as the Brahminical dread of contact with impurity. Then as now, these outcasts lived miserably in mud or grass huts, obtaining food by begging. When tired of life, or when being old or disabled their relatives were tired of keeping them, they often submitted to 'sumajh' or burial alive. But they more frequently threatened to perform 'sumajh' with the view of extracting alms from the charitable, who were induced to believe that the death of the leper would be credited to them, unless they bought off the sacrifice. 'Sumajh,' or leper burial alive, has

been practised comparatively recently in more than one of the Native States.

"The Native principalities are now much more advanced in most respects than they were only a few years back. By coming into contact with the progressive civilization of adjoining British districts, the Governments of Native States were forced to advance; for they felt their existence would be imperilled. And this advance was most materially assisted by the successful endeavours made by the Indian Government to secure the better education of the young Indian princes and nobles. The Imperial Government also, and especially under Lord Mayo, enunciated care for the sick as one of the most urgent duties of the feudatory rulers of India. Owing to such measures, aided by the personal influence of the Political, and the assistance of the Medical Officers attached to the Native Courts, a hospital or dispensary has, amongst other features of civilization, been established at every large capital; while in some States ramifications of such central establishments have rendered the people almost as well off, in the matter of medical relief, as those in British territory. As it will not be necessary to refer again, except incidentally, to the Native States, I may here remark that all the medical institutions are supported at the cost of the Durbar or Government of each State. They are, as a rule, superintended by the European Medical Officer attached to the Political Residency, aided by native assistants.

"Although the recent condition of the Native States represents what formerly prevailed all over Hindustan, it must not be understood that the people were devoid of charity; only the charity of the well-to-do classes did not take the form of medical relief. In the absence of a qualified medical profession recognised by the State, the confidence felt in the physic of the 'vaid's' and 'hukeems' was something akin to the faith of Byron, who without any such excuse designated medicine as 'the destructive art of healing.' Moreover, the organization of hospitals was not understood, and the necessary discipline of such establishments was foreign to the habits and ideas of the people. The poor (who now throng the hospitals of India), having had no experience of the advantages of such institutions, would probably not have resorted thereto had hospitals and dispensaries been opened under native control. So suspicious were the people on the first opening of a hospital in one of the Native States, that sweetmeats, of which they are very fond, were ordered to be given daily to each patient, as an encouragement to attend! So in former times the charitable preferred spending their money in sinking wells, in constructing *serais* or rest-houses for travellers, in endowing temples, and in feeding the poor, particularly

Brahmins. In this manner, enormous sums have been disbursed and are still expended, especially in food for the destitute. This laudable charity of the Indians, although often confined to their own caste people, and to occasions of family festival, is one of the reasons why it has never been thought necessary to establish any system of poor-law relief in British India. Of late years native charity has been often directed towards building and endowing medical institutions, and many Indian gentlemen have given most liberally for such purposes."

CHAPTER V.

MEDICINE IN CHINA, TARTARY, AND JAPAN.

Origin of Chinese Culture.—Shamanism.—Disease-Demons.—Taoism.—Medicine Gods.—Mediums.—Anatomy and Physiology of the Chinese.—Surgery.—No Hospitals in China.—Chinese Medicines.—Filial Piety.—Charms and Sacred Signs.—Medicine in Thibet, Tartary, and Japan.

CHIEF amongst the Mongolian peoples are the Chinese. Prof. Max Müller argues that the Chinese, the Thibetans, the Japanese, Coreans, and the Ural-Altaic or Turanian nations are in the matter of religion closely related.

Chinese culture has recently been declared by Professor Terrien de la Couperie, François Lenormant, and Sayce to be of Accadian origin. Hieratic Accadian has been identified with the first five hundred Chinese characters, and it is believed by Professor de la Couperie that the Chinese entered north-western China from Susiana, about the twenty-third century before Christ.¹

In the Finno-Tartarian magical mythology, we have not only the link which connects the religion of heathen Finland with that of Accadian Chaldæa, but we discover what is of more importance in tracing the origin of the magic and medicine of the old civilizations of the world from a primitive and coarse cosmogony, such as we have examined in so many savage peoples.

As it is impossible to separate the ancient medical belief of a people from its religious conceptions, if we admit Prof. Max Müller's theory, we must also hold that it embraces the medical notions of these peoples. And so we find that one of the striking characteristics of the Mongolic religions is an extensive magic and sorcery—Shamanism. Practically the gods and heroes of the poetry of these peoples are sorcerers, and their worshippers value above everything their magical powers. Taoism, a Chinese religion of great antiquity and respect, involves an implicit faith in sorcery; and the Chinese and Mongolians have degenerated Buddhism into Shamanism.²

¹ See an article entitled "A New Light on the Chinese," in *Harper's Magazine*, December, 1892.

² Prof. Teile, in art. "Religions," *Ency. Brit.*

Confucianism is the chief religion of the Chinese. It is simply a development of the worship of ancestors, which was the aboriginal religion of the country. All the Chinese are ancestor-worshippers, to whatever other native religion they may belong.¹

The pure Confucian is a true Agnostic.

Although Chinese civilization is without doubt extremely ancient, we are unable to study it as we study that of Egypt or Chaldæa, on account of the absence of monuments or a literature older than a few centuries before Christ, which would give us a reliable history.

The Chinese attribute to Huang-ti (B.C. 2637) a work on medicine, which is still extant, entitled Nuy-kin, which is probably not older than the Christian era. They also attribute to the Emperor Chin-nung (B.C. 2699) a catalogue of medicinal herbs.²

The demon theory of disease universally obtains throughout the Chinese empire. All bodily and mental disorders spring either from the air or spirits. They are sent by the gods as punishments for sins committed in a previous state of existence. In a country where Buddhism is largely believed, it is natural to suppose that there is little sympathy with the suffering and afflicted. One might offend the gods by getting cured, or delay the working out of the effects of the expiatory suffering. Archdeacon Grey found a grievously afflicted monk in a monastery in the White Cloud mountains. He desired to take him to the Canton Medical Missionary Hospital; but the abbot took him aside, and begged him not to do so, as the sufferer had doubtless in a former state of existence been guilty of some heinous crime, for which the gods were then making him pay the well-merited penalty.³

Nevertheless, when sick, the Chinese often have recourse to some deity, who is supposed to have caused the illness. If the patient dies, they do not blame the god, but they withhold the thank-offering which is customary in case of recovery. The death is declared to be in accordance with the "*reckoning of Heaven*." If the patient recovers, the deity of the disease gets the credit. Prayers and ceremonies are made use of to induce the "destroying" demon to banish the baneful influences under his control. Sudden illness is frequently ascribed to the evil influence of one of the seventy-two malignant spirits or gods. In very urgent cases an "arrow" is obtained from an idol in the temple. This "arrow" is about two feet long, and has a single written word, "Command," upon it. If the patient recovers, it must be returned to the temple with a present; if he dies, an offering of mock-money is

¹ Cummings, *Wanderings in China*, vol. i. p. 188.

² Baas, *Hist. Med.*

³ "Doctoring in China," *National Review*, May, 1889.

made. The "arrow" is considered as the warrant of the god for the disease-spirit to depart.¹

In L'ien-chow, in the province of Kwang-si, if a man hits his foot against a stone, and afterwards falls sick, it is at once recognised that there was a demon in the stone; and the man's friends accordingly go to the place where the accident happened, and endeavour to appease the demon with offerings of rice, wine, incense, and worship. After this the patient recovers.²

Sometimes it is difficult to find out what particular god has been offended. Then some member of his family asks, with a stick of burning incense in his hand, that the offended deity will make known by the mouth of the patient how he has been offended. The disease is sometimes, as amongst savage nations, ascribed to the spirit of a deceased person. The god of medicine is invited to the sick man's house in cases where malignant sores or inflamed eyes are prevalent. Ten men sometimes become "security" for the sick person. After offerings and ceremonies, the names of the ten are written upon paper, and burned before the idol. When a patient is likely to die, the last resort is to employ Tauist priests to pray for him, and then the following ceremony is performed:—A bamboo, eight or ten feet long, with green leaves at the end, is provided, and a coat belonging to the sick man is suspended with a mirror in the place where the head of the wearer of the coat would be. The priest repeats his incantations, to induce the sick man's spirit to enter the coat, as it is supposed that the patient's spirit is leaving the body or has been hovering near it. The incantations are to induce the spirit to enter the coat, so that the owner may wear both together. Sometimes the family will hire a Tauist priest to climb a ladder of knives, and perform ceremonies for the recovery of the sick man. This is thought to have a great effect on the disease-spirits.³

The Emperor *Fuh-Hi*, who invented the eight diagrams, was the first physician whose name has come down to modern times. He is one of the *Sang Huông*, or "Three Emperors," and is the deity of doctors.

I Kuang Tái Uông is the god of surgery. The people say he was a foreigner, of the Loochoo Islands, who came to the middle kingdom and practised surgery. As he was deaf whilst in the flesh, his worshippers consider he is thus afflicted now that he is a deity, so they pray into his ear, as well as offer him incense and candles.⁴

¹ Doolittle's *Social Life of the Chinese*, vol. i. p. 145.

² *Folk Medicine*, p. 4; Dennys, *Folklore of China*, p. 96.

³ Doolittle's *Social Life of the Chinese*, vol. i. p. 153.

⁴ *Ibid.*, vol. i. p. 275.

Ling Chui Nü is the goddess of midwifery and children. If children are sick, their parents employ Tauist priests in some of her temples to perform a ceremony for their cure.¹

Ioh Uong Chü Sū is the god of medicine. It is said that he was a distinguished physician who was deified after his death. He is now generally worshipped by dealers in drugs and by their assistants. On the third day of the third month, they make a feast in his honour, and burn candles and incense before his image at his temple. Practising physicians do not usually take any part in these proceedings.²

The Chinese have goddesses of small-pox and measles, which are extremely popular divinities. Should it thunder after the pustules of small-pox have appeared, a drum is beaten, to prevent them breaking. On the fourteenth day ceremonies are performed before the goddess, to induce her to cause the pustules to dry up.³

Mediums are often employed to prescribe for the sick. They behave precisely as our spiritualists do, and pretend that the divinity invoked casts himself into the medium for the time being, and dictates the medicine which the sick person requires.⁴

In the "Texts of Táoism"⁵ we are informed that "In the body there are seven precious organs, which serve to enrich the state, to give rest to the people, and to make the vital force of the system full to overflowing. Hence we have the heart, the kidneys, the breath, the blood, the brains, the semen, and the marrow. These are the seven precious organs. They are not dispersed when the body returns (to the dust). Refined by the use of the Great Medicine, the myriad spirits all ascend among the Immortals."

Anatomy and physiology have made no progress in China, because there has never been any dissection of the body. The only books on the subject in the Chinese language are Jesuit translations of European works. Briefly stated, Chinese ideas on the subject are as follows:—In the human body there are six chief organs in which "moisture" is located—the heart, liver, two kidneys, spleen, and lungs. There are six others in which "warmth" abides—the small and large intestine, the gall bladder, the stomach, and the urinary apparatus. They reckon 365 bones in the whole body, eight in the male and six in the female skull, twelve ribs in men and fourteen in women. They term the bile the seat of courage; the spleen, the seat of reason; the liver, the granary of the soul; the stomach, the resting-place of the mind.

A familiar drug in Chinese materia medica, which is sold in all the

¹ Doolittle's *Social Life of the Chinese*, vol. i. p. 265.

² *Ibid.*, vol. i. p. 275.

³ *Ibid.*, vol. i. p. 154.

⁴ *Ibid.*, vol. ii. p. 116.

⁵ *Sacred Books of the East*, vol. xi. p. 272.

drug-shops, is the Kou-Kouo, or bean of St. Ignatius. The horny vegetable is used, after bruising and macerating, in cold water, to which it communicates a strong bitter taste. "This water," says M. Huc,¹ "taken inwardly, modifies the heat of the blood, and extinguishes internal inflammation. It is an excellent specific for all sorts of wounds and contusions. . . . The veterinary doctors also apply it with great success to the internal diseases of cattle and sheep. In the north of China we have often witnessed the salutary effects of the Kou-Kouo."

This bean is the seed of *Strychnos Ignatia*, and the plant is indigenous to the Philippine Islands. The action and uses of ignatia are identical, says Stillé, with those of *nux vomica*.²

The medical profession is a very crowded one in China, as it is perfectly free to any who choose to practise it. No diploma or certificate of any kind is necessary in order to practise medicine in China. The majority of the regular practitioners, if such they can be called, are men who have failed to pass their examinations as literates. There is one, and apparently only one, check on quackery. The Chinese have a special place in their second hell which is reserved for ignorant physicians who will persist in doctoring sick folk. In the fourth hell are found physicians who have used bad drugs, and in the seventh hell are tortured those who have taken human bones from cemeteries to make into medicines. In the very lowest hell are physicians who have misused their art for criminal purposes. These evil persons are ceaselessly gored by sows.³

Naturally, the sciences of anatomy and physiology are entirely neglected by these self-constituted native doctors. All the learning they require is the ability to copy out prescriptions from a medical book. Dr. Gould, a physician of long experience in China, tells us that the native physician is depicted in Chinese primers as a person between the heathen priest and the fortune-teller—his profession is looked upon as a combination of superstition and legerdemain.⁴

The court physicians at Peking are of a much superior class, and are compelled to pass examinations before their appointment.

Astrology, charms, amulets, and characts enter largely into Chinese medical practice. The priests keep bundles of paper charms ready for emergencies. They are supposed to know which of the different methods of using them are most appropriate to each case. Masks are used by children at certain times to ward off the deity of small-pox.

¹ *Travels in Tartary*, vol. i. chap. vii.

² *National Dispensatory*, p. 754.

³ Gordon Cumming's *Wanderings in China*, vol. i. p. 174.

⁴ "Doctoring in China," *National Review*, May, 1889.

The masks are very ugly, as the deity is believed only to afflict pretty children.¹

"Isaac Vossius," says Southey, "commended the skill of the Chinese physicians in finding out by their touch, not only that the body is diseased (which, he said, was all that our practitioners knew by it), but also from what cause or what part the sickness proceeds. To make ourselves masters of this skill, he would have us explore the nature of men's pulses, till they became as well known and as familiar to us as a harp or lute is to the players thereon; it not being enough for them to know that there is something amiss which spoils the tune, but they must also know what string it is which causes that fault."²

Surgery has never made much progress in China; the Chinese have too much respect for the dead to employ corpses for anatomical purposes, and they have the greatest unwillingness to draw blood or perform any kind of operation on the living. Their ideas of the structure of the human frame are therefore purely fanciful. "The distinctive Chinese surgical invention is acupuncture, or the insertion of fine needles of hardened silver or gold for an inch or more (with a twisting motion) into the seats of pain or inflammation."³ Rheumatism and gout are thus treated, and 367 points are specified where needles may be inserted without injury to great vessels or vital organs.

Dentistry and ophthalmic surgery are practised by specialists.

There are no hospitals; the Chinese consider it would be a neglect of the duty which they owe to their relatives to send them when sick to such institutions. Chinese doctors often receive a fixed salary so long as their patient remains in good health; when he falls sick, the pay is stopped till he gets well. The doctor must ask his patient no questions, nor does the patient volunteer any information about his case. Having felt the sick man's pulse, looked at his tongue, and otherwise observed him, he is supposed to have completed his diagnosis, and must prescribe accordingly. Some of the Chinese prescriptions are very costly; precious stones and jewels are often powdered up with musk and made into pills, which are considered specifics for small-pox and fevers. Another remedy is *Kiuchiu*, a bitter wine made of spirit, aloes, myrrh, frankincense, and saffron, which is said to be a powerful tonic. The profession of medicine is hereditary, receiving very few recruits from outside; hence its complete stagnation.⁴

One of the industries of the Foo-Chow beggars is the rearing of

¹ Doolittle's *Social Life of the Chinese*, vol. ii. p. 321.

² Southey, *Common Place Book*, ser. iv. p. 547.

³ *Ency. Brit.*, art. "Surgery."

⁴ *Chambers' Journal*, Dec. 29, 1888, p. 831.

snakes, which are used by the druggists to prepare their medicines. Snake-wine is used as a febrifuge, and snake's flesh is considered a nutritious diet for invalids. Skulls, paws, horns, and skins of many animals, as bears, bats, crocodiles and tigers, are used in medicine. For fever patients physicians prescribe a decoction of scorpions, while dysentery is treated by acupuncture of the tongue. Pigeon's dung is the favourite medicine for women in pregnancy; and the water in which cockles have been boiled is prescribed for skin diseases, and for persons who are recovering from small-pox. Rat's flesh is eaten as a hair-restorer, and human milk is given to aged persons as a restorative. Crab's liver administered in decoction of pine shavings is used in a form of skin disease. In Gordon Cumming's *Wanderings in China*, from which many of the above facts are taken, it is stated that "dried red-spotted lizard, silkworm moth, parasite of mulberry trees, asses's glue, tops of hartshorn, black-lead, white-lead, stalactite, asbestos, tortoise-shell, stag-horns and bones, dog's flesh and ferns are all recommended as tonics." Burnt straw, oyster shells, gold and silver leaf, and the bones and tusks of dragons are said to be astringent. These dragons' bones are the fossil remains of extinct animals. Some of the medicines of standard Chinese works are selected purely on account of their loathsomeness, such as the ordure of all sorts of animals, from man down to goats, rabbits, and silk-worm, dried leeches, human blood, dried toads, shed skins of snakes, centipedes, tiger's blood, and other horrors innumerable hold a conspicuous place in the Chinese pharmacopœia. Nor, says Gordon Cumming, are these the worst. The physicians say that some diseases are incurable save by a broth made of human flesh cut from the arm or thigh of a living son or daughter of the patient.¹

The same author tells us that a young girl who so mutilated herself to save her mother's life was specially commended in the *Official Gazette* of Peking for July 5th, 1870.

Medicines prepared from the eyes and vitals of the dead are supposed to be efficacious. Leprosy is believed to be curable by drinking the blood of a healthy infant. Dr. Macarthy and Staff-Surgeon Rennie were present at an execution in Peking, when they saw the executioner soak up the blood of the decapitated criminal with large balls of pith, which he preserved. These are dried and sold to the druggists under the name of "shue-man-tou" (blood-bread), which is prescribed for a disease called "chong-cheng," which Dr. Rennie supposed to be pulmonary consumption.²

The *Times* says (October 10th, 1892) that the character of the accusations made in the publications against Europeans has created

¹ *Wanderings in China*, vol. i. p. 173.

² *Ibid.*, vol. i. p. 173.

as much astonishment amongst the foreign residents in China as it has in the West. Missionaries especially were charged—and the charges have been made frequently during the past thirty years—with bewitching women and children by means of drugs, enticing them to some secret place, and there killing them for the purpose of taking out their hearts and eyes. Dr. Macgowan, a gentleman who has lived for many years in China, has published a statement showing that from the point of view of Chinese medicine these accusations are far from preposterous. It is one of the medical superstitions of China that various portions of the human frame and all its secretions possess therapeutic properties. He refers to a popular voluminous *Materia Medica*—the only authoritative work of the kind in the Chinese language—which gives thirty-seven anthropophagous remedies of native medicine. Human blood taken into the system from another is believed to strengthen it; and Dr. Macgowan mentions the case of an English lady, now dead, who devoted her fortune and life to the education of girls in Ningpo, who was supposed by the natives to extract the blood of her pupils for this purpose. Human muscles are supposed to be a good medicament in consumption, and cases are constantly recorded of children who mutilate themselves to administer their flesh to sick parents.

Never, says Dr. Macgowan, has filial piety exhibited its zeal in this manner more than at the present time. Imperial decrees published in the *Pekin Gazette*, often authorising honorary portals to be erected in honour of men, and particularly women, for these flesh offerings, afford no indication of the extent to which it is carried, for only people of wealth and influence can obtain such a recognition of the merit of filial devotion. It is very common among the comparatively lowly, but more frequent among the *literati*. A literary graduate now in his own service, finding the operation of snipping a piece of integument from his arm too painful, seized a hatchet and cut off a joint of one of his fingers, which he made into broth mixed with medicine and gave to his mother. It is essential in all such cases that the recipient should be kept in profound ignorance of the nature of the potion thus prepared, and in no case is the operation to be performed for an inferior, as by a husband for a wife, or a parent for a child. This belief in the medical virtues of part of the human body (of which a large number of instances which cannot be repeated here are given) has led to a demand from native practitioners which can sometimes only be supplied by murder. Of this, too, examples are given from official records and other publications, some of them of quite recent date.

Dr. Macgowan reminds us that men capable of these atrocities have been found in other civilized lands. He says:—


"It was in a model Occidental city, not inaptly styled the 'Modern Athens,' that subjects were procured for the dissecting-room through murder, at about the same amount of money as that paid in China for sets of eyes and hearts for medicine. A remedy was found which promptly suppressed that exceptional crime in the West. In China murder of this nature can also be prevented, but not speedily. Time is an indispensable factor in effecting the suppression of homicide, which is the outcome of medical superstition. That superstition is strongly intrenched in an official work, the most common book, after the classics, in the empire. So long as the concluding chapter is retained in the materia medica, it will be futile to undertake the abolition of murder for medical purposes; and so long as these abhorrent crimes prevail in China, so long will fomenters of riots against foreigners aim to make it appear that the men and women from afar are addicted to that form of murder, and thus precious lives will continue to be exposed to forfeiture."

The most celebrated drug in Chinese Materia Medica is ginseng, the root of a species of *Panax*, belonging to the natural order *Araliaceæ*. The most esteemed variety is found in Corea; an inferior kind comes from the United States, the *Panax quinquefolium*, and is often substituted for the real article. All the Chinese ginseng is Imperial property, and is sold at its weight in gold. The peculiar shape of the root, like the body of man—a peculiarity which it shares with mandrake and some other plants—led to its employment in cases where virile power fails, as in the aged and debilitated. Special kinds have been sold at the enormous sum of 300 to 400 dollars the ounce. Europeans have hitherto failed, says the *Encyclopædia Britannica*, to discover any wonderful properties in the drug. It is no doubt a remarkable instance of the doctrine of signatures (*q.v.*). In all cases of severe disease, debility, etc., the Chinese fly to this remedy, so that enormous quantities are used. The Hon. H. N. Shore, R.N., says that the export from New-Chang in Manchuria to the Chinese ports of this article for one year alone reached the value of £51,000. It seems to be simply a mild tonic, very much like gentian root. Some of the pharmacies are on a very large scale; six hundred and fifty various kinds of leaves are commonly kept for medicinal purposes.

When a Chinese physician is not able to procure the medicines he needs, he writes the names of the drugs he desires to employ on a piece of paper, and makes the patient swallow it; the effect is supposed to be quite as good as that of the remedy itself, and certainly in many cases it would be infinitely more pleasant to take! This custom of swallowing charms is seen again in the sick-room, some of the charms which

are stuck round it being occasionally taken down, burned, and mixed with water, which the patient has to drink. Gongs are beaten and fire-crackers let off to frighten away the demons which are supposed to be tormenting the sick person.

"The superstition as to the powers of the 'evil eye,'" says Denny,¹ "may almost be deemed fundamental to humanity, as I have yet to read of a people amongst whom it does not find some degree of credence." In China a pregnant woman, or a man whose wife is pregnant, is called "four-eyed"; and children are guarded against being looked at by either, as it would probably cause sickness to attack them.

One of the commonest diagrams to be met with in China is the mystic *svastika*, or "Thor's Hammer" . It is found on the wrappers of medicines, and is accepted as the accumulation of lucky signs possessing ten thousand virtues.²

The physicians of Thibet, says M. Huc,³ assign to the human body four hundred and forty diseases, neither more nor less. Lamas who practise medicine have to learn by heart the books which treat of these diseases, their symptoms, and the method of curing them. The books are a mere hotch-potch of aphorisms and recipes. The Lama doctors have less horror of blood than the Chinese, and practise bleeding and cupping. They pay great attention to the examination of a patient's water. A thoroughly competent Lama physician must be able to diagnose the disease and treat the patient without seeing him. It is sufficient that he make a careful examination of the water. This he does not by chemical tests, as in Western nations, but by whipping it up with a wooden knife and listening to the noise made by the bubbles. A patient's water is mute or crackling according to his state of health. Much of Chinese and Tartar medicine is mere superstition. "Yet," says M. Huc very judiciously, "notwithstanding all this quackery, there is no doubt that they possess an infinite number of very valuable recipes, the result of long experience. It were perhaps rash to imagine that medical science has nothing to learn from the Tartar, Thibetian, and Chinese physicians, on the pretext that they are not acquainted with the structure and mechanism of the human body. They may, nevertheless, be in possession of very important secrets, which science alone, no doubt, is capable of explaining, but which, very possibly, science itself may never discover. Without being scientific, a man may very well light upon extremely scientific results." The fact that everybody in China and Tartary can make gunpowder, while probably

¹ *Folk Lore of China*, p. 49.

² *Ibid.*

³ *Travels in Tartary*.

none of the makers can chemically explain its composition and action is a proof of this fact.

M. Huc says that every Mongol knows the name and position of all the bones which compose the frame of animals. They are exceedingly skilful anatomists, and are well acquainted with the diseases of animals, and the best means of curing them. They administer medicines to beasts by means of a cow-horn used as a funnel, and even employ enemas in their diseases. The cow-horn serves for the pipe, and a bladder fixed on the wide end acts as a pump when squeezed. They make punctures and incisions in various parts of the body of animals. Although their skill as anatomists and veterinary surgeons is so great, they have only the simplest and rudest tools wherewith to exercise this art.

"Medicine in Tartary," says M. Huc,¹ "is exclusively practised by the Lamas. When illness attacks any one, his friends run to the nearest monastery for a Lama, whose first proceeding, upon visiting the patient, is to run his fingers over the pulse of both wrists simultaneously, as the fingers of a musician run over the strings of an instrument. The Chinese physicians feel both pulses also, but in succession. After due deliberation, the Lama pronounces his opinion as to the particular nature of the malady. According to the religious belief of the Tartars, all illness is owing to the visitation of a Tchutgour, or demon; but the expulsion of the demon is first a matter of medicine. The Lama physician next proceeds, as Lama apothecary, to give the specific befitting the case; the Tartar pharmacopœia rejecting all mineral chemistry, the Lama remedies consist entirely of vegetables pulverised, and either infused in water or made up into pills. If the Lama doctor happens not to have any medicine with him, he is by no means disconcerted; he writes the names of the remedies upon little scraps of paper, moistens the paper with his saliva, and rolls them up into pills, which the patient tosses down with the same perfect confidence as though they were genuine medicaments. To swallow the name of a remedy, or the remedy itself, say the Tartars, comes to precisely the same thing.

"The medical assault of the usurping demon being applied, the Lama next proceeds to spiritual artillery, in the form of prayers, adapted to the quality of the demon who has to be dislodged. If the patient is poor, the Tchutgour visiting him can evidently only be an inferior Tchutgour, requiring merely a brief, offhand prayer, sometimes merely an interjectional exorcism. If the patient is very poor, the Lama troubles himself with neither prayer nor pill, but goes away, recommending the friends to wait with patience until the sick patient gets

¹ *Travels in Tartary.*

better or dies, according to the decree of Hormoustha. But where the patient is rich, the possessor of large flocks, the proceedings are altogether different. First it is obvious that a devil who presumes to visit so eminent a personage must be a potent devil, one of the chiefs of the lower world; and it would not be decent for a great Tchutgour to travel like a mere sprite; the family, accordingly, are directed to prepare for him a handsome suit of clothes, a pair of rich boots, a fine horse, ready saddled and bridled, otherwise the devil will never think of going, physic or exorcise him how you may. It is even possible, indeed, that one horse will not suffice; for the demon, in very rich cases, may turn out upon inquiry to be so high and mighty a prince, that he has with him a number of courtiers and attendants, all of whom have to be provided with horses.

"Everything being arranged, the ceremony commences. The Lama and numerous co-physicians called in from his own and other adjacent monasteries, offer up prayers in the rich man's tents for a week or a fortnight, until they perceive that the devil is gone,—that is to say, until they have exhausted all the disposable tea and sheep. If the patient recovers, it is a clear proof that the prayers have been efficaciously recited; if he dies, it is a still greater proof of the efficaciousness of the prayers, for not only is the devil gone, but the patient has transmigrated to a state far better than that he has quitted.

"The prayers recited by the Lamas for the recovery of the sick are sometimes accompanied with very dismal and alarming rites. The aunt of Tokoura, chief of an encampment in the Valley of Dark Waters, visited by M. Huc, was seized one evening with an intermittent fever. 'I would invite the attendance of the doctor i.lama,' said Tokoura, 'but if he finds there is a very big Tchutgour present, the expenses will ruin me.' He waited for some days, but as his aunt grew worse and worse, he at last sent for a Lama; his anticipations were confirmed. The Lama pronounced that a demon of considerable rank was present, and that no time must be lost in expelling him. Eight other Lamas were forthwith called in, who at once set about the construction in dried herbs of a great puppet, which they entitled the Demon of Intermittent Fever, and which, when completed, they placed on its legs by means of a stick, in the patient's tent.

"The ceremony began at eleven o'clock at night; the Lamas ranged themselves in a semicircle round the upper portion of the tent with cymbals, sea-shells, bells, tambourines, and other instruments of the noisy Tartar music. The remainder of the circle was completed by the members of the family squatting on the ground close to one another, the patient kneeling, or rather crouched on her heels, opposite the

Demon of Intermittent Fever. The Lama doctor in chief had before him a large copper basin filled with millet, and some little images made of paste. The dung-fuel threw amid much smoke a fantastic and quivering light over the strange scene. Upon a given signal, the clerical orchestra executed an overture harsh enough to frighten Satan himself, the lay congregation beating time with their hands to the charivari of clanging instruments and ear-splitting voices. The diabolical concert over, the Grand Lama opened the Book of Exorcisms, which he rested on his knees. As he chanted one of the forms, he took from the basin from time to time a handful of millet, which he threw east, west, north, and south, according to the Rubric. The tones of his voice as he prayed were sometimes mournful and suppressed, sometimes vehemently loud and energetic. All of a sudden he would quit the regular cadence of prayer, and have an outburst of apparently indomitable rage, abusing the herb puppet with fierce invectives and furious gestures. The exorcism terminated, he gave a signal by stretching out his arms right and left, and the other Lamas struck up a tremendously noisy chorus in hurried, dashing tones. All the instruments were set to work, and meantime the lay congregation, having started up with one accord, ran out of the tent one after the other, and tearing round it like mad people, beat it at their hardest with sticks, yelling all the while at the pitch of their voices in a manner to make ordinary hair stand on end. Having thrice performed this demoniac round, they re-entered the tent as precipitately as they had quitted it, and resumed their seats. Then, all the others covering their faces with their hands, the Grand Lama rose and set fire to the herb figure. As soon as the flames rose he uttered a loud cry, which was repeated with interest by the rest of the company. The laity immediately arose, seized the burning figure, carried it into the plain, away from the tents, and there, as it consumed, anathematized it with all sorts of imprecations; the Lamas, meantime, squatted in the tent, tranquilly chanting their prayers in a grave, solemn tone. Upon the return of the family from their valorous expedition, the praying was exchanged for joyous felicitations. By-and-by each person provided with a lighted torch, the whole party rushed simultaneously from the tent, and formed into a procession, the laymen first, then the patient, supported on either side by a member of the family, and lastly, the nine Lamas, making night hideous with their music. In this style the patient was conducted to another tent, pursuant to the orders of the Lama, who declared she must absent herself from her own habitation for an entire month.

“After this strange treatment the malady did not return. The probability is that the Lamas, having ascertained the precise moment at

which the fever-fit would recur, met it at the exact point of time by this tremendous counter-excitement and overcame it.

"Though the majority of the Lamas seek to foster the ignorant credulity of the Tartars, in order to turn it to their own profit, we have met some of them who frankly avowed that duplicity and imposture played considerable part in all their ceremonies. The superior of a Lamasery said to us one day, 'When a person is ill the recitation of prayers is proper, for Buddha is the master of life and death; it is he who rules the transmigration of beings. To take remedies is also fitting, for the great virtue of medicinal herbs also comes to us from Buddha. That the Evil One may possess a rich person is credible; but that in order to repel the Evil One, the way is to give him dress, and a horse, and what not, this is a fiction invented by ignorant and deceiving Lamas, who desire to accumulate wealth at the expense of their brothers.'"

M. Huc describes a grand solemnity he witnessed in Tartary, when a Lama Boktè cut himself open, took out his entrails, placed them before him, and then after returning them, closed the wound while the blood flowed in every direction; yet he was apparently as well as before the operation, with the exception of extreme prostration. Good Lamas, says M. Huc, abhor such diabolical miracles; it is only those of bad character who perform them. The good priest describes several other "supernaturalisms," as he calls them, of a similar kind, which are frequently performed by the Lamas. He sets them all down to diabolical agency.¹

The Turanian nations have their priests of magic, says M. Maury,² who exercise great power over the people. He thinks this is partly due to the pains they take to look savage and imposing, but still more to the over-excited condition in which they are kept by the rites to which they have recourse; they take stimulants and probably drugs to cause hallucinations, convulsions, and dreams, for they are the dupes of their own delirium.

"Amongst all nations," says Castrèn, "of whatever race, disease is always regarded as a possession, and as the work of a demon."³

Says M. Maury: "The Baschkirs have their Shaitan-kuriaz, who expel devils, and undertake to treat the invalids regarded as possessed by means of the administration of certain remedies. This Shaitan, whose name has been borrowed from the Satan of the Christians, since the Baschkirs have come into contact with the Russians, is held by the Kalmuks to be the chief author of all our bodily sufferings. If they wish to expel him,

¹ *Travels in Tartary*, vol. i. chap. ix. ² *La Magie et l'Astrologie*, p. 13.

³ *Vorlesungen über die Finnische Mythologie*, p. 173.

they must resort not only to conjurations, but also to cunning. The aleyss places his offerings before the sick man, as if they were intended for the wicked spirit; it being supposed that the demon, attracted by their number or their value, will leave the body which he is tormenting in order to seize upon the new spoil. According to the Tcheremisses, the souls of the dead come to trouble the living, and in order to prevent them from doing so, they pierce the soles of the feet, and also the heart of the deceased, thinking that, being then nailed into their tomb, the dead could not possibly leave it. . . . The Kirghis tribes apply to their sorcerers, or *Baksy*, to chase away demons, and then to cure the diseases they are supposed to produce. To this end they whip the invalid until the blood comes, and then spit in his face. In their eyes every disease is a personal being. This idea is so generally received amongst the Tchuvaches also, that they firmly believe the least omission of duty is punished by some disease sent to them by Tchemen, a demon whose name is only an altered form of Shaitan. An opinion strongly resembling this is found again amongst the Tchuktchis; these savages have recourse to the strangest conjurations to free from disease; their Shamans are also subject to nervous states, which they bring on by an artificial excitement."¹

JAPANESE MEDICINE.

The Chinese, as early as 218 B.C., found their way amongst the Japanese doctors with medical books, dating back, it is alleged, to 2737 B.C., and the influence of Chinese medicine upon Japanese medicine has continued to be a controlling one up to the recent introduction of European medicines now in vogue. The old style of things is, according to Dr. Benjamin Howard, still followed by 30,000 out of the 41,000 physicians now practising throughout the Empire. Of the 30,000 of the old vernacular school, one of them is still on the list of the Court physicians, and maintains a high reputation. The impression throughout Europe that coloured papers, exorcisms, etc., are the basis of Chinese and Japanese medicine is erroneous. Dr. Howard has seen nearly 2,000 books by these people, covering most of the departments of medicine, but amongst which *materia medica* occupies the leading place. In these books are the doctrines of the successive schools, strikingly like some of those which in past centuries existed amongst our own ancestors. The successive medical colleges have always had a professor of astrology, but the solid fact remains that the *materia*

¹ *La Magie et l'Astrologie*, p. 283, and foll.; also Lenormant, *Chaldean Magic*, p. 212.

medica has included amongst its several hundred remedies a large number of those used by ourselves, and these are not only vegetable, but animal and mineral, in the latter class mercury being prominent. Surgery became a separate branch as long since as the seventh or eighth century.¹

¹ *National Druggist.*

CHAPTER VI.

THE MEDICINE OF THE PARSEES.

Zoroaster and the *Zend-Avesta*.—The Heavenly Gift of the Healing Plants.—Ormuzd and Ahriman.—Practice of the Healing Art and its Fees.

ZOROASTER, or more correctly Zarathustra, was the founder, or at least the reformer of the Magian religion, and one of the greatest teachers of the East. The date of Zoroaster is involved in obscurity, but all classical antiquity agrees that he was an historical person. Neither do we know his birthplace. Duncker gives 1000 B.C. as his period; others consider that he was possibly a contemporary of Moses. In the *Zend-Avesta* and the records of the Parsees he is said to have lived in the reign of Vitaçpa or Gushtap, whom most writers recognise as Darius Hystaspis. Pliny notices works of Zoroaster treating of Nature and of precious stones. He is credited with the invention of magic; and as ancient medicine was closely connected with magic, we may, in this sense, consider him as a physician. Aristotle and Eudoxus stated that he lived six thousand years before Plato. It is hopeless, however, to attempt to settle a question so involved in obscurity. The most characteristic feature of Zoroaster's teaching is the dualistic conception of the scheme of the universe, according to which two powers—a good and an evil—are for ever contending for the mastery—Ormuzd against Ahriman. Ormuzd is of the light, and from this emanate the good spirits whose laws are executed by Izeds, who are angels and archangels.

Ahriman is of the darkness, and from this emanate Daêvas, powers by whom mankind are led to their destruction—evil powers, false gods, devils. From these Daêvas proceed all the evil which is in the world; they are agents of that higher evil principle Druj, or falsehood and deception, which is called Ahriman, the spirit enemy. These Daêvas send to men, and are the causes of all diseases, which can only be cured by the good spirits. Man belongs either to Ormuzd or to Ahriman according to his deeds. If he offers sacrifice to Ormuzd and the gods, and helps them by good thoughts, good deeds, and spreads life over the world and opposes Ahriman by destroying evil, then he is a man of

Asha, who drives away fiends and diseases by spells. He who does the contrary to this is a Dravant,—“demon,” a foe of Asha. The man of Ormuzd will have a seat near him in heaven.¹

According to the *Zend-Avesta* Thritha was the first physician who drove back death and disease. Ormuzd (Ahura Mazda) brought him down from heaven ten thousand healing plants which had grown around the tree of eternal life, which is the white Haoma (the Indian Soma), or Gaokerena, which grows in the middle of the sea, Vouru-kasha. These are the Haomas, says Darmesteter.²

One is the yellow, or earthly Haoma, and is the king of healing-plants; the other, or white, is that which, on the day of resurrection, will make men immortal. Thritha was one of the first priests of Haoma, the life and health-giving plant, and thus he obtained his skill in medicine. Darmesteter says that Thritha was originally the same as Thraëtaona of the *Rig-Veda*.³

“We see that Thraëtaona fulfilled the same functions as Thritha. According to Hamza he was the inventor of medicine. The Tavidis (formulas of exorcism) against sickness are inscribed with his name, and we find in the Avesta itself the Fravashi of Thraëtaona invoked ‘against itch, hot fever, humours, cold fever, vâvareshi; against the plagues created by the serpent.’ We learn from this passage that disease was understood as coming from the serpent; in other words, that it was considered a sort of poisoning, and this is the reason why the killer of the serpent was invoked to act against it. Thus Thritha Thraëtaona had a double right to the title of the first of the healers, both as a priest of Haoma and as the conqueror of the serpent.”

Ormuzd (Ahura Mazda) said that Thritha “asked for a source of remedies—he obtained it from Khshathia-Vaivya”—to withstand the diseases and infection which Angra-Mainyu had created by his witchcraft. As Ahriman had created ten thousand diseases, so Ormuzd gave mankind the same number of healing plants. This idea is firmly fixed in the minds of every one of us to this day: for every disease there must of necessity somewhere be a remedy, and that usually with the common people is supposed to be a plant. The Soma is the king of the healing plants in India and that also came down from heaven. “Whilst coming down from heaven the plants said, ‘He will never suffer any wound the mortal whom we touch.’”⁴

Ormuzd, having given man the healing plants, said: “To thee, O Sickness, I say, avaunt! To thee, O Death, I say, avaunt! To thee,

¹ Darmesteter, *Zend-Avesta*.

² *Zend-Avesta*; Vendidad. *Sacred Books of the East*, vol. iv. p. 219.

³ *Ibid.*

⁴ *Rig-Veda*, x. 97, 17.

O Pain, I say, avaunt ! To thee, O Fever, I say, avaunt ! To thee, O Disease, I say, avaunt ! ”¹

In the Vendidad (Fargard vii. a)² it is demanded, “ If a worshipper of Mazda want to practise the art of healing, on whom shall he first prove his skill ? On worshippers of Mazda or on worshippers of the Daêvas ? ”

Ahura Mazda answered : “ On worshippers of the Daêvas shall he first prove himself, rather than on worshippers of Mazda. If he treat with the knife a worshipper of the Daêvas, and he die ; if he treat with the knife a second worshipper of the Daêvas, and he die ; if he treat with the knife for the third time a worshipper of the Daêvas, and he die, he is unfit to practise the art of healing for ever and ever. Let him therefore never attend any worshipper of Mazda ; let him never treat with the knife any worshipper of Mazda, nor wound him with the knife. If he shall ever attend any worshipper of Mazda ; if he shall ever treat with the knife any worshipper of Mazda, and wound him with the knife, he shall pay for it the same penalty as is paid for wilful murder. If he treat with the knife a worshipper of the Daêvas, and he recover ; if he treat with the knife a second worshipper of the Daêvas, and he recover ; if for the third time he treat with the knife a worshipper of the Daêvas, and he recover, then he is fit to practise the art of healing for ever and ever. He may henceforth at his will attend worshippers of Mazda ; he may at his will treat with the knife worshippers of Mazda, and heal them with the knife.”

Naturally, the rising surgeons would seek their clinical material amongst the heretics.

We learn from the *Zend-Avesta* that the doctrine of Zoroaster teaches that not only real death makes one unclean, but partial death also. The demon claims as his property everything which goes out of the body of man, and that because it is dead. The breath which leaves the mouth is unclean, so that fire, which is sacred, must not be blown with it. Nail parings and cuttings of the hair are unclean, and unless protected by spells are likely to become the weapons of the demons. Whatever altered the body in its nature was demon's work. On this principle the menstruation of women causes their uncleanness. The menses are sent by Ahriman ; the woman is possessed by a demon while they last ; she has to be kept apart ; she cannot even receive food from hand to hand ; she may not eat much lest she feed the demon. So utterly unclean is a woman who has borne a dead child that she is not allowed to drink water unless in danger of death. Logic compelled that a sick man should be treated as one possessed. Sickness was sent by Ahriman,

¹ *Vendidad*, Fargard xx. 7.

² *Sacred Books of the East*, vol. iv. p. 83.

and is to be cured by washings and spells. The most powerful therefore of all medical treatment is magic. It was always more highly esteemed by the faithful than treatment by drugs and the lancet.¹ Hair and nails, which having been cut off have at once become the property of Ahriman, may be withdrawn from his power by prayer, and by being deposited in the earth in consecrated circles, which, being drawn round them, intrench them against the fiend.²

In the *Zend-Avesta* it is laid down that a woman who has been just delivered of a child is unclean. When delivered of a dead child, she must drink gômêz. Says Darmesteter:³ "So utterly unclean is she, that she is not even allowed to drink water, unless she is in danger of death; and even then, as the sacred element has been defiled, she is liable to the penalty of a Perhôtanu. It appears from modern customs that the treatment is the same when the child is born alive; the reason of which is that, in any case, during the first three days after delivery she is in danger of death. A great fire is lighted to keep away the fiends, who use then their utmost efforts to kill her and her child. She is unclean only because the death-fiend is in her."

The Saddar 16 says: "When there is a pregnant woman in a house, one must take care that there be fire continually in it; when the child is brought forth, one must burn a candle, or, better still, a fire, for three days and three nights, to render the Dêvs and Drugs unable to harm the child; for there is great danger during those three days and nights after the birth of the child."

A table of physician's fees is given in the Vendidad. The healer is to attend a priest and get him well for his blessing; the master of a house is to pay the value of a cheap ox for the same service; but the lord of a province is to pay the value of a chariot and four. The wife of the master of a house pays the value of a she-ass for her healing, but the wife of the lord of a province pays the value of a she-camel.

It declared that, "If several healers offered themselves together, O Spitama Zarathustra! namely, one who heals with the knife, one who heals with herbs, and one who heals with the holy word (*i.e.* by spells), it is this one who will best drive away sickness from the faithful."

¹ *Herod.*, i. 138.

² *Zend-Avesta*. Translated by J. Darmesteter in *Sacred Books of the East*, vol. iv. p. 187. This throws a curious light on a custom which has been observed in operation all over the world, of taking care not to throw about hair or nail-cuttings, lest the devil should get hold of them.

³ *Zend-Avesta*, Introduction, v. xciii. § 13.

BOOK III.
GREEK MEDICINE.

CHAPTER I.

THE MEDICINE OF THE GREEKS BEFORE THE TIME OF HIPPOCRATES.

Apollo, the God of Medicine. — Cheiron. — Æsculapius. — Artemis. — Dionysus. — Ammon. — Hermes. — Prometheus. — Melampus. — Medicine of Homer. — Temples of Æsculapius. — The Early Ionic Philosophers. — Empedocles. — School of Crotona. — The Pythagoreans. — Grecian Theory of Diseases. — School of Cos. — The Aselepiads. — The Aliptæ.

GODS OF MEDICINE.

THE origin of Greek medicine is intermixed with the Hellenic mythology. We must begin, not with ÆSCULAPIUS (ASCLEPIOS), but with the sun itself. APOLLO (PÆAN), as the god who visits men with plagues and epidemics, was also the god who wards off evil and affords help to men. He was constantly referred to as "the Healer," as *Alexicacus*, the averter of ills. He is the saviour from epidemics, and the *pæan* was sung in his honour (*Iliad*, I. 473, XXII. 391).

APOLLO promoted the health and well-being of man, and was the god of prolific power, the trainer of youth, and thus he was the chief deity of healing. As the god of light and purity he was truly the health-god; and as light penetrates the darkness, he was the god of divination and the patron of prophecy, acting chiefly through women when in a state of ecstasy. Homer says that Pæan¹ was the physician of the Olympian gods (*Iliad*, V. 401, 899).

Next we find Cheiron, the wise and just centaur (*Iliad*, XI. 831), who had been instructed by Apollo and Artemis, and was famous for his skill in medicine. He was the master and instructor of the most celebrated heroes of Greek story, and he taught the art of healing to ÆSCULAPIUS (B.C. 1250). This god of medicine was said to be the son of Apollo. Pausanius² explains the allegory thus: "If Asclepius is the air—indispensable to the health of man and beast, yet Apollo is the sun, and rightly is he called the father of Asclepius, for the sun, by his yearly course, makes the air wholesome."

¹ Our word Peony derives its Latin name (*Pæonia*) from the name of Apollo the Healer. He cured the gods of their diseases, and healed their wounds by means of this root.

² vii. 23.

In the Homeric poems *Æsculapius* is not a divinity, but merely a human being. Homer, however, calls all those who practise the art of healing descendants of *Pæan*; his healing god is *Apollo*, and never *Æsculapius*.

Legend tells that *Æsculapius* was the son of *Apollo* by *Coronis*, who was killed by *Artemis* for unfaithfulness, and her body was about to be burnt on the pyre, when *Apollo* snatched the boy out of the flames and handed him over to the centaur *Cheiron*, who taught him how to cure all diseases. *Pindar* tells the story of his instruction in the art of medicine:—

“ The rescued child he gave to share
Magnesian Centaur's fostering care ;
 And learn of him the soothing art
 That wards from man diseases' dart.
 Of those whom nature made to feel
 Corroding ulcers gnaw their frame ;
 Or stones far hurled, or glittering steel,
 All to the great physician came.
 By summer's heat or winter's cold
 Oppressed, of him they sought relief.
 Each deadly pang his skill controlled,
 And found a balm for every grief.
 On some the force of charmed strains he tried,
 To some the medicated draught applied ;
 Some limbs he placed the amulets around,
 Some from the trunk he cut, and made the patient sound.”¹

It was believed that he was even able to restore the dead to life. According to one tradition, *Æsculapius* was once shut up in the house of *Glaucus*, whom he was to cure, and while he was absorbed in thought there came a serpent, which twined round his staff, and which he killed. Then he saw another serpent, which came carrying in its mouth a herb, with which it recalled to life the one that had been killed; and the physician henceforth made use of the same herb to restore dead men to life, the popular belief, even in these early times, evidently being that what would cure serpents would be equally efficacious for men. We may therefore consider the snake-entwined staff of the healing god as the symbol of the early faith in the efficacy of experiments on animals, though in this instance the experiment was on a dead one.

Æsculapius was only too successful a practitioner; for when he was exercising his art upon *Glaucus*, *Zeus* killed the physician with a flash of lightning, as he feared that men might gradually escape death altogether. Others say the reason was that *Pluto* complained that by such medical treatment the number of the dead was too much diminished.

¹ Wheelwright's translation of *Pindar. Third Pythian Ode, 80-95.*

On the request of Apollo, Zeus placed Æsculapius amongst the stars. His wife was Epione (the soother). Homer mentions Podalirius and Machaon as sons of Æsculapius, and the following are also said to have been his sons and daughters—Janiscus, Alexenor, Aratus, Hygeia, Ægle, Iaso, and Panacea. Most of these, as Hygeia, the goddess of health, and Panacea, the all-healing, it will be seen, are merely personifications of the powers ascribed to their father. There is no doubt that facts are the basis of the Æsculapian story. The divinity was worshipped all over Greece. His temples were for the most part built in mountainous and healthy places, and as often as possible in the neighbourhood of a medicinal spring; in a sense they became the prototypes of our hospitals and medical schools. Multitudes of sick persons visited them, and the priests found it to their interest to study diseases and their remedies; for though faith and religious fervour may do much for the sick, the art of the physician and the hand of the surgeon are adjuncts by no means to be despised even in a temple clinic. The chief of the Æsculapian temples was at Epidaurus; there no one was permitted to die and no woman to give birth to a child. The connection of the serpent with the divinity probably arose from the idea that serpents represent prudence and renovation, and have the power of discovering the secret virtues of healing plants.

The idea of the serpent twined round the rod of Æsculapius is that "as sickness comes from him, from him too must or may come the healing."¹ The knots on the staff are supposed to symbolize the many knotty points which arise in the practice of physic.

MINERVA was the patroness of all the arts and trades; at her festivals she was invoked by all who desired to distinguish themselves in medicine, as well as by the patients whom they failed to cure. As the goddess of intelligence and inventiveness, she was the Greek patroness of physicians, and was the same deity as Pallas Athene, who bestows health and keeps off sickness.

ARTEMIS, or DIANA, as the Romans called the Greek goddess, was a deity who, inviolate and vigorous herself, granted health and strength to others. She was the sister of Apollo, and though a dispenser of life could, like her brother, send death and disease amongst men and animals. Sudden deaths, especially amongst women, were described as the effect of her arrows. She was *θεὰ σώτεια*, who assuaged the sufferings of mortals. When Æneas was wounded, she healed him in the temple of Apollo.² Yet Artemis *ταυροπόλος* produced madness in the minds of men.³

¹ *Sacred Books of the East*, vol. iv. p. 219 note.

² *Il.*, V. 447.

³ Sophoc., *Ajax*.

She was the Cretan Diktynna, and that goddess wore a wreath of the magic plant *diktamnou* or *dictamnus*, called by us *dittany* (*dictamnus ruber*, or *albus*); it grows in abundance on Mounts *Didé* and *Ida* in Crete.

The Cretan goddess BRITOMARTIS was sometimes identified with Artemis. She too was a goddess of health as also of birth, and was supposed to dispense happiness to mortals.

BACCHUS, or, as he was called by the Greeks, DIONYSUS, as the god of wine, and an inspired and an inspiring deity, who revealed the future by oracles, cured diseases by discovering to sufferers in their dreams their appropriate remedies. The prophet, the priest, and the physician are so often blended in one in the early history of civilization, that the same ideas naturally clustered round Bacchus as around Apollo, and other great benefactors of mankind. The giver of vines and wine was the dispenser of the animating, exalting, intoxicating powers of nature. As wine restores the flagging energies of the body and mind, and seems to have the power of calling back to life the departing spirit, and inspiring the languishing vitality of man, Bacchus would naturally enough be a god of medicine. The intoxicating properties of wine would be connected with inspiration, and so Bacchus had a share in the oracles of Delphi and Amphicleia. He was invoked as a θεὸς σωτήρ against raging diseases.

AMMON was an Ethiopian divinity whose worship spread over Egypt, and thence to Greece, and was described as the spirit pervading the universe, and as the author of all life in nature.

HERMES TRISMEGISTUS of the Greeks was identified in the time of Plato with Thoth, Thot, or Theut of the Egyptians.¹

The Egyptian THOTH was considered the father of all knowledge, and everything committed to writing was looked upon as his property; he was therefore the embodied λόγος, and so τρις μέγιστος, or the superlatively greatest. He was identified by the Greeks more or less completely with their own HERMES, or MERCURY as he was known to the Romans; he was the messenger of the gods; as dreams are sent by Zeus, it was his office to convey them to men, and he had power to grant refreshing sleep or to deny the blessing. As the gods revealed the remedies for sickness in dreams, Hermes became a god of medicine.

Thoth, the ibis-headed, was the Egyptian god of letters, the deity of wisdom in general, who aided Horus in his conflict with Seth, and recorded the judgments of the dead before Osiris. Hermes κριοφόρος, the averter of diseases, was worshipped in Boeotia. Hermes, the Greek

¹ Cicero, *De Nat. Deor.*, iii. 22.

deity, was king of the dead and the conductor of souls to their future home. Probably, therefore, we may rightly look upon Thoth, H  r  mes, and Hermes Trismegistus as the same person. By many Thoth is considered to be the Egyptian   sculapius, as he was the inventor of the healing art; the Phœnician god Esmun, one of the ancient Cabiri, was invested with similar attributes, and was worshipped at Carthage and Berytus. The authorship of the oldest Egyptian works on medicine is ascribed to Thoth. These were engraved on pillars of stone. The works of Thoth were ultimately incorporated into the so-called "Hermetic Books." Clement of Alexandria, who is our only ancient authority on these Hermetic works, says they were forty-two in number.

PROMETHEUS (the man of freethought) is considered by   schylus as the founder of human civilization.

  schylus, in his *Prometheus Chained*, makes the god say how he had taught each useful art to man. As regards medicine, he says :—

“ Hear my whole story ; thou wilt wonder more
What useful arts, what science I invented.
This first and greatest ; when the fell disease
Preyed on the human frame, relief was none,
Nor healing drug, nor cool, refreshing draught,
Nor pain-assuaging unguent ; but they pined
Without redress, and wasted, till I taught them
To mix the balmy medicine, of power
To chase each pale disease, and soften pain.”¹

MELAMPUS, who was famous for his prophetic powers, was believed by the Greeks to have been the first mortal who practised the art of medicine, and established the worship of Dionysus in Greece. As doctors are frequently expected to exercise the art of prophecy in conjunction with their profession, it is unfortunate that we have retrograded from the Melampian type. The eminent physician who tells the over-inquisitive friends of his patients that he is “a doctor and not a prophet,” might be answered that originally the two functions were combined. Melampus taught the Greeks to mix their wine with water. He is fabled to have learned the language of the birds from some young serpents who had been reared by him, and who licked his ears when he was asleep. When he awoke he found that he understood what the birds said, and that he could foretell the future.

Iphiclus had no children, and he asked Melampus to tell him how he could become a father. He advised him to take the rust from a knife, and drink it in water during ten days. The remedy was eminently successful, and is the first instance in which a preparation of iron is known to have been prescribed in medicine. He cured the daughters

¹ *Prometheus*. Plays of   schylus, Morley’s Ed.

of Prætus by giving them hellebore (which has been called Melampodium by botanists), and he received the eldest of the princesses in marriage. He cured the women of Argos of a severe distemper which made them insane, and the king showed his gratitude by giving him part of his kingdom. He received divine honours after his death, and temples were raised to him.

THE MEDICINE OF HOMER.

As Homer is supposed to have lived about 850 B.C., a study of such references as are to be found in the *Iliad* and *Odyssey* which relate to medicine and surgery will throw an important light on the state of the healing art as it was practised at that early period of Greek history.

There is little mention of disease in Homer. We read of sudden death, pestilence, and the troubles of old age, but there is hardly any fixed morbid condition noticed.

Although the poet exhibits considerable acquaintance with medical lore, and the human body in health and disease, he could have had little or no acquaintance with anatomy, because amongst Greeks, as amongst Jews, it was considered a profanation to dissect or mutilate the human corpse.

It was not till the rise of the Alexandrian school in the golden age of the Ptolemies that this sentiment was overcome. Still Homer must have known that it was the custom of the Egyptians to embalm their dead, as he refers to the process in the *Iliad*,¹ where Thetis poured into the nostrils of the corpse red nectar and ambrosia to preserve it from putrefaction. Ambrosia is referred to by Virgil as useful for healing wounds, and nectar was supposed to preserve flesh from decay. Homer's heroes seem to have been singularly healthy folk; their only demand for the services of the army surgeons arose from the accidents of war. MACHAON distinguished himself in surgery, and PODALIRIUS is reputed to have been the first phlebotomist. Their services would be chiefly required for extracting arrow-heads and spear-heads, checking hæmorrhage by compression and styptic applications, and laying soothing ointments on wounded and bruised surfaces. Beyond these minor duties of the army surgeon, we find little record of their work. Mention is not made of amputations, of setting of fractures, or tying of arteries. Wounds were probed by Machaon, surgeon to Menelaus (Book IV.).

Whatever may have been the surgical skill of Machaon, we have proof that the art of dieting the wounded was not at all understood in the Homeric days. The wine and cheese was not the kind of refreshment which found favour in Plato's time with the Greek physicians.

¹ Book XIX.

Plato, in the *Republic* (Book III.), deals with the question at some length. He says that the draught of Pramnian wine with barley meal and cheese was an inflammatory mixture, and a strange potion for a man in the state of Eurypylus.

But, he excuses the sons of Asclepius for their treatment, explaining that their method was not intended for coddling invalids, but for such as had not time to be ill, and that the healing art was revealed for the benefit of those whose constitutions were naturally sound, and that doctors used to expel their disorders by drugs and the use of the knife without interrupting their customary avocations, declining altogether to assist chronic invalids to protract a miserable existence by a studied regimen.

Le Clerc says¹ that Plato is wrong in this explanation of the Homeric treatment, and that the true one is that in those days the dietary of the sick was not understood. Modern medicine will decline to accept either theory. The fact is, Homer's physicians were right. Good old wine was the best thing possible to restore a man fainting from the loss of blood; as for the cheese it was grated fine, and therefore was a peculiarly nutritious food in a fairly digestible condition. The barley water at all times was at least irreproachable. Although there is little evidence in the Homeric poems of any medical treatment which passes the limit of surgery, this is by no means conclusive against the possession of the higher art by Podalirius. In an epic poem, as Le Clerc points out, the subject is altogether too exalted to admit of medical discourses on the treatment of colic and diarrhœa.

Neither must we be surprised, that when the pestilence appeared in the camp of Agamemnon, Podalirius and Machaon did nothing to avert it. Such a disease was at that time considered beyond all human skill, and as the direct visitation of the gods. Homer clearly explains that the pestilence was due to their anger. Galen adduces evidence to prove that Æsculapius did really practise medicine, by music and by gymnastics, or exercises on foot and horseback.

As Le Clerc says,² this may have been patriotic exaggeration on the part of Galen. To Podalirius is attributed the invention of the art of bleeding. As he returned from the Trojan war, he was driven by a tempest on the shores of Caria, where a shepherd, having learned that he was a physician, took him to the king, whose daughter was sick. He cured her by bleeding from both arms; the king gave her to him in marriage, with a rich grant of land. This is the oldest example which we have of bleeding.

Podalirius had a son Hippolochus, of whom the great Hippocrates was

¹ *Hist. de la Médecine*, Pt. I., liv. i., ch. xiv.

² *Ibid.*

a descendant. Le Clerc devotes a chapter of his *History of Medicine* to reflections on the antiquity of the practice of venesection, and speculates on the manner of its discovery. He says, the fact that Homer is silent on the subject makes neither for nor against the theory that it was known in his time; in such works as those of the poet he was under no obligation to specify particularly the remedies employed by the doctors. He speaks, for example, of soothing medicines and bitter roots without further definition. It would be as reasonable to agree that purgation was unknown from Homer's silence on the matter.

Homer knew something of the parts of the body where wounds are most fatal. He says (Book IV., l. 183), "The arrow fell in no such place as death could enter at," and (Book VIII., l. 326), where the arrow struck the right shoulder 'twixt the neck and breast, "the wound was wondrous full of death."

He knew much of drugs and medicinal plants: *φάρμακον* (pharmakon) in the *Iliad* is a remedy, an unguent or application, and is mentioned nine times; in the *Odyssey* it is a drug or medicinal herb, and is referred to twenty times. In Book XI., Eurypylus, when wounded, is treated with the "wholesome onion," a potion is confected with good old wine of Pramnius, with scraped goat's-milk cheese and fine flour mixed with it. Later on in the same book, we read of the bruised, bitter, pain-assuaging root being applied to a wound; it was some strong astringent bitter plant, probably a species of geranium.

Then in the *Odyssey* (Book IV. 200) occurs the reference to *ne-penthe*, a drug which has puzzled commentators exceedingly; some say it was poppy juice, others hashish; we have also the magic moly, which Mercury gave to Ulysses against the charms of Circe. By some this is thought to have been the unpoetical garlic, by others to be wild rue, such as Josephus refers to. It was more probably the mandrake.

There is a very curious and important reference to sulphur, as a disinfectant fumigation in the *Odyssey* (Book XXII. 481):—

"Bring sulphur straight, and fire" (the monarch cries).

"She hears, and at the word obedient flies,

With fire and sulphur, cure of noxious fumes,

He purged the walls and blood-polluted rooms."

This is precisely what the sanitary authorities do with fever dens at the present day.

Homer several times refers to Machaon:—

"And great Machaon to the ships convey.

A wise physician, skilled our wounds to heal,

Is more than armies to the public weal."

(*Iliad*, XI. 614.)

With Podalirius, his brother, also a "famed surgeon," he went to Troy with thirty ships. Homer calls them "divine professors of the healing arts" (*Iliad*, II. 728), and to them was committed the care of the medical work of the expedition.

When Menelaus had been wounded by the spear of Pandarus, Machaon, we are told by Homer (*Iliad*, IV. 218)—

"Sucked the blood, and sovereign balm infused,
Which Cheiron gave, and Æsculapius used."

Agamede is referred to by Homer (*Iliad*, XI. 739) as acquainted with the healing properties of all the plants that grow on the earth. She was a daughter of Augeias, and wife of Mulius. The poet refers to her as—

"She that all simples' healing virtues knew,
And every herb that drinks the morning dew."¹

HESIOD lived about the same time as Homer. He wrote the famous *Works and Days*, a species of farmer's calendar, and the *Theogony*.

On account of the knowledge he possessed of the properties of plants, Theophrastus, Pliny, and others ranked him amongst the physicians.²

Both Podalirius and Machaon were held in great honour, not only as combatants, but as medical advisers, and Homer's account of them exhibits the medical profession of his time as one that was very highly esteemed. In the fragment of Arctinus which remains to us, we find thus early the distinction made between the arts of medicine and surgery, the two principal divisions of medical science: "Then Asclepius bestowed the power of healing upon his two sons; nevertheless, he made one of the two more celebrated than the other; on one did he bestow the lighter hand, that he might draw missiles from the flesh, and sew up and heal all wounds; but the other he endowed with great precision of mind, so as to understand what cannot be seen, and to heal seemingly incurable diseases."³

This very interesting extract not only shows the early separation of the arts of medicine and surgery, but it exhibits very clearly how it arose that the former was always held to be the higher branch of the medical profession. To sew up a laceration, or extract an arrow or a thorn from the flesh, demanded only manual dexterity; but "to understand that which cannot be seen," and heal internal organs that cannot even be touched, required a skill and a mental precision that men even in those early times were able to appreciate as much the higher of the

¹ I am indebted to an article on "The Medicine of Homer" in *The British Medical Journal* for much of the information in this section.

² Le Clerc, *Hist. de la Méd.*, Pt. I., liv. ii., ch. ix.

³ Arctinus, *Ethiopsis*. Translated in Puschmann's *Hist. Med. Education*, p. 35.

two arts. There seems, however, some confusion of the two branches in the lines :—

“ A wise physician, skilled our wounds to heal,
Is more than armies to the public weal.”

If we suppose that the account of venesection which attributes its discovery to Podalirius is fabulous, this would only serve to prove the antiquity of the practice. Hippocrates is said to be the first medical writer who has spoken of bleeding,¹ yet we must not suppose it was unknown before his time. He advises blood-letting from the arm, from the temporal vessels, from the leg, etc., in some cases even to fainting. He is familiar with cupping and other methods of abstracting blood ; it is not probable, therefore, that the operation was a new one in his day.

The discovery of the practice of purging as a remedy was attributed to Melampus. But we know that the Egyptians made use of purgative and emetic medicines. There were many purgatives in use in the time of Hippocrates, as hellebore, elaterium, colocynth, and scammony. All these medicines could not have been discovered at once, as Le Clerc points out ; mankind, therefore, must have gradually acquired their use. When persons were overloaded in the stomach and constipated, nothing was more natural than that they should seek relief by removing the mechanical causes of their distress. Some one had taken some herb which had caused him to vomit or to be purged, and had experienced the benefit of the evacuation ; he told his friends, and they perhaps had been aided by similar means. Or again, some illness had been alleviated by the supervention of diarrhoea, and art was called in to imitate the beneficial effect of nature's cure. In this way, says Le Clerc, bleeding may reasonably have been discovered : a severe headache is often relieved by bleeding from the nose, what more natural than that the process of relief should be imitated by opening a vein ?

Pliny, indeed, in his usual manner, introduces a fable to account for the discovery of venesection. He says ² that the hippopotamus having become too fat and unwieldy through over-eating, bled himself with a sharp-pointed reed, and when he had drawn sufficient blood, closed the wound with clay. Men have imitated the operation, says Pliny. This is matched by the story of the ibis with her long bill being the inventor of the clyster. Most of the medical beast stories are probably on a level with these.

¹ Le Clerc, *Hist. de la Méd.*, Pt. I., bk. i., ch. xviii.

² Lib. VIII., cap. 26.

Hygeia, the wife of *Æsculapius*, and her children, bore names which show the same poetic fancy as that which constituted Apollo the author of medicine. *Æsculapius* is the air. *Hygeia* is health; *Ægle* is brightness or splendour, because the air is illumined and purified by the sun. *Iaso* is recovery, *Panacea* the universal medicine, *Roma* is strength.

The ancients everywhere believed that the healing art was taught to mankind by the gods. "The art of medicine," says Cicero, "has been consecrated by the invention of the immortal gods."¹

Hippocrates² attributed the art of medicine to the Supreme Being. As the Greeks believed that the arts in general were invented by the gods, it was a natural belief that the knowledge of medicine should have been taught by the heavenly powers. The mysteries of life, disease, and death were peculiarly the province of supernatural beings, and man has ever attributed to such powers all those things which he could not comprehend.

THE TEMPLES OF ÆSCULAPIUS.

The worship of Asclepius or *Æsculapius* is so closely associated with the practice of Greek medicine that it is impossible to understand the one without knowing something of the other. Sick persons made pilgrimages to the temples of the god of healing, just as now they go to Lourdes, St. Winifred's Well, or other famous Christian shrines for the recovery of their health. After prayers to the god, ablutions, and sacrifices, the patient was put to sleep on the skin of the animal offered at the altar, or at the foot of the statue of the divinity, while the priests performed their sacred rites. In his sleep he would have pointed out to him in a dream what he ought to do for the recovery of his health. Sometimes the appropriate medicine would be suggested, but more commonly rules of conduct and diet would suffice. When the cure took place, which very frequently happened by suggestion as in modern hypnotism, and by the stimulus to the nervous system consequent upon the journey, and the hope excited in the patient, a record of the case and the cure was carved on the temple walls. Thus were recorded the first histories of cases, and their study afforded the most valuable treatises on the healing art to the physicians who studied them. The priests of *Æsculapius* were sometimes called Asclepiads, but they did not themselves act as physicians, nor were they the actual founders of Greek medicine. The true Asclepiads were healers and not priests. *Anathemata* (ἀνάθεμα, anything offered up) were offerings of models in gold, silver, etc., of diseased legs, feet, etc., or of deformed limbs consecrated

¹ Cic., *Tusc. Dis.*, III. 1.

² Hippocr., *De Frisca Medic.*

to the gods in the temples by the devotion of the patients who had received benefit from the prayers to the deities who were worshipped therein. The priests of the temples sold these again and again to fresh patients.

THE EARLY IONIC PHILOSOPHERS.

The various schools of Greek philosophy were intimately associated with the study of medicine. They endeavoured to fathom the mystery of life, and the relationship of the visible order of things to the unseen world. The philosophers were therefore not only physicists, but metaphysicians, and the unhappy science of medicine, a homeless wanderer, had to shelter herself now with the natural philosophers and again with the metaphysicians. Probably the philosophers never really practised physic, but merely speculated about it, as did Plato. A brief notice of the various philosophers of the Ionic, Italian, Eleatic, and Materialistic schools who were more or less associated with the study of medicine must suffice as an introduction to Greek medicine proper, which had its origin with Hippocrates.

THALES OF MILETUS (about 609 B.C.), the Ionian philosopher, introduced Egyptian and Asiatic science into Greece. He had probably in his travels in the land of the Pharaohs devoted himself to mathematical pursuits, and if not a scientific inquirer was a deep speculator on the origin of things. He held that everything arises from water, and everything ultimately again resolves itself into water. Everything, he said, is full of gods; the soul originates motion (the magnet has a soul, according to him), and so the indwelling power or soul of water produces the phenomena of the natural world. He must not, however, be understood as teaching the doctrine of the Soul of the Universe, or of a Creating Deity. Thales was the first writer on physics and the founder of the philosophy of Greece. Le Clerc connects him with medicine by his converse with the priest-physicians of Egypt, and that he had performed certain expiatory or purifying ceremonies for the Lacedæmonians which could only be done by such as were divines and physicians.¹

PHERECYDES, the Syrian, a philosopher who lived about the same time as Thales, is said by Galen to have written upon diet.

EPIMENEDES was a sort of Greek Rip Van Winkle, who purified Athens in the time of a plague by means of mysterious rites and sacrifices. He excelled as a fasting man, so that he was said to have been exempt from the ordinary necessities of nature, and could send out his soul from his body and recall it like the Mahatmas. He was of the

¹ Le Clerc, *Hist. de la Mèd.*, Pt. I., liv. ii., c. iv.

class of priestly bards, a seer and prophet who was well acquainted with the virtues of plants for medicinal purposes, and as he was believed to have gone to sleep in a cave for fifty-seven years, he was credited with the possession of supernatural medicinal powers.¹

ANAXIMANDER, born B.C. 610, is said to have been a pupil of Thales. He taught that a single determinate substance having a middle nature between water and air was the infinite, everlasting, and divine, though not intelligent material from which all things had their origin. This he called the *ἄπειρον*, the chaos. All substances were derived thence by the conflict of heat and cold and the electric affinities of the particles. The atomic theory is foreshadowed here.

ANAXIMENES was the friend of Thales and Anaximander, and all three were born at Miletus. He considered that air was the first cause of all things, or primary condition of matter; all finite things were formed from the infinite air by compression or rarefaction produced by eternal motion. Heat and cold are produced by the varying density of the primal element. He held the eternity of matter like his brother philosophers, and believed that the soul itself is merely a form of air. He held no Divine Author of the Universe, motion being a necessary law of the universe, and with motion and air he required nothing else for the constitution of all things.

HERACLEITUS of Ephesus, born about 556 B.C., embodied his system of philosophy in his work *On Nature*. He held that the ground of all phenomena is a physical principle, a living unity, pervading everything, inherent in all things—fire, that is, as he explains, a clear light fluid “self-kindled and self-extinguished.” The world was not created by God, but evolved from the rational intelligence which guides the universe—fire. Fire longs to manifest itself in various forms; from its pure state in heaven it descends, assumes the form of earth, passing in its progress through that of water. Man’s soul is a spark of the divine fire.

ANAXAGORAS, born about 499 B.C., was the friend of Pericles and Euripides at Athens. Seeking to explain the world and man by a higher cause than the physical ones of his predecessors, he postulated *nous*—that is, mind, thought, or intelligence. As nothing can come out of nothing, he did not attribute to this *nous* the creation of the world, but only its order and arrangement. Matter is eternal, but existed as chaos till *nous* evolved order from the confusion. Baas² says his physiological and pathological views may be thus described: “The animal body, by means of a kind of affinity, appropriates to itself from the nutritive supply the portions similar to itself. Males originate in

¹ Laertius, Lib. I., c. 113.

² *Hist. Med.*, p. 88.

the right, females in the left side of the uterus. Diseases are occasioned by the bile which penetrates into the blood-vessels, the lungs, and the pleura." He undertook the dissection of animals, remarked the existence in the brain of the lateral ventricles, and was the first to declare that the bile is the cause of acute sickness.¹

DIODEGENES OF APOLLONIA, the eminent natural philosopher, lived at Athens about 460 B.C. He was a pupil of Anaximenes, and wrote a work entitled *On Nature*, in which he treated of physical science generally. Aristotle has preserved for us some of the few fragments which remain. The most important is the description of the origin and distribution of the veins, and is inserted in the third book of Aristotle's *History of Animals*. Diogenes Laërtius gives an account of the philosophical teaching of the philosopher: "He maintained that air was the primal element of all things; that there was an infinite number of worlds, and an infinite void; that air, densified and rarefied, produced the different members of the universe; that nothing was produced from nothing, or was reduced to nothing; that the earth was round, supported in the middle, and had received its shape from the whirling round of the warm vapours, and its concretion and hardening from cold."²

Diogenes recognised no distinction between mind and matter, yet he considered air possessed intellectual energy.

We find in this philosopher many indications that the vascular system was in some degree beginning to be understood.³ Mr. Lewes and Mr. Grote agree that Diogenes deserves a higher place in the evolution of philosophy than either Hegel or Schwegler.

EMPEDOCLES of Agrigentum, born about 490 B.C., now bears forward the flaming torch of medical science, and in his hands it burns more brightly still. Aristotle mentions him among the Ionian physiologists, and ranks him with the atomistic philosophers and Anaxagoras. These all sought to discover the basis of all changes and to explain them. According to Empedocles: "There are four ultimate kinds of things, four primal divinities, of which are made all structures in the world—fire, air, water, and earth. These four elements are eternally brought into union, and eternally parted from each other, by two divine beings or powers, love and hatred—an attractive and a repulsive force which the ordinary eye can see working amongst men, but which really pervade the whole world. According to the different proportions in which these four indestructible and unchangeable matters are combined with

¹ Puschmann, *Hist. Med. Education*, p. 46.

² See on this Dr. Greenhill's remarks in *Smith's Dict. Greek and Roman Biography*, loc. cit.

³ Aristotle, *Hist. Animal.*, iii. 2.

each other is the difference of the organic structure produced; *e.g.*, flesh and blood are made of equal parts of all four elements, whereas bones are one-half fire, one-fourth earth, and one-fourth water. It is in the aggregation and segregation of elements thus arising that Empedocles, like the atomists, finds the real process which corresponds to what is popularly termed growth, increase, or decrease. Nothing new comes or can come into being; the only change that can occur is a change in the juxtaposition of element with element."¹

He considered that men, animals, and plants are demons punished by banishment, but who, becoming purified, may regain the home of the gods. It is hardly necessary to say that he held the demoniacal possession theory of disease, and treated all complaints by means appropriate to the theory. Anticipating the modern opinions of the bacteriologists, he banished epidemics by building great fires and draining the water from marshy lands. He understood something of the causes of infectious diseases, and in their treatment usurped the province of the gods who had sent them.² He believed the embryo was nourished through the navel. We owe to him the terms *amnion* and *chorion* (*i.e.*, the innermost and outer membranes with which the foetus is surrounded in the womb). He believed that death was caused by extinction of heat, that expiration arose from the upward motion of the blood, and inspiration from the reverse. He is said to have raised a dead woman to life.³

Empedocles believed in the doctrine of re-incarnation. "I well remember," he says, "the time before I was Empedocles, that I once was a boy, then a girl, a plant, a glittering fish, a bird that cut the air." To his disciples he said: "By my instructions you shall learn medicines that are powerful to cure disease, and re-animate old age—you shall recall the strength of the dead man, when he has already become the victim of Pluto."⁴ Further speaking of himself, he says: "I am revered by both men and women, who follow me by ten thousands, inquiring the road to boundless wealth, seeking the gift of prophecy, and who would learn the marvellous skill to cure all kinds of diseases."⁵

THE SCHOOL OF THE PYTHAGOREANS AT CROTONA.

Although in ancient Greece the art of medicine, as we have already shown, was closely connected with the temples, if not actually with religion, its entanglement with philosophy was a scarcely less unfortunate connection, and it was not able to make any real progress till

¹ *Ency. Brit.*, Ninth Ed., vol. iii. p. 178.

² Baas, *Hist. Med.*, p. 88.

³ *Ibid.*, p. 89.

⁴ Laertius, c. 77, c. 59.

⁵ *Ibid.*, c. 62.

HIPPOCRATES liberated it from both priests and philosophers. 582 years before Christ PYTHAGORAS was born, the ideal hero or saint whom we faintly discern through the mythical haze which has always enveloped him. Philosopher, prophet, wonder-worker, and physician, he gathered into his mind as into a focus the wisdom of the Brahmans, the Persian Magi, the Egyptians, the Phœnicians, the Chaldæans, the Jews, the Arabians, and the Druids of Gaul, amongst whom he had travelled, if we may believe what is reported of him. He may have visited Egypt,¹ at any rate, besides acquainting himself with the countries of the Mediterranean. His authentic history begins with his emigration to Crotona, in South Italy, about the year 529. There he founded a kind of religious brotherhood or ethical-reform society, and "appeared as the revealer of a mode of life calculated to raise his disciples above the level of mankind, and to recommend them to the favour of the gods."² Grote believes that the removal to Crotona was prompted by the desire to study medicine in its famous school, probably combined with the notion of instructing the pupils in his philosophy. He rendered great services to the healing art by insisting on the necessity of a thorough comprehension of the organs, structure, and functions of the body in their normal, healthy condition; this must be conceded, though his visionary philosophy did much to destroy the scientific value of his medical teaching.

The founder of the healing art amongst the Greeks and Hellenic peoples generally was Pythagoras. He was imbued with Eastern mysticism, teaching that the air is full of spiritual beings, who send dreams to men and cause to men and cattle disease and health. He taught that these spirits must be conciliated by lustrations and invocations. Pliny says³ that he taught that holding dill (*anethum*) in the hand is good against epilepsy. The health of the body is to be maintained by diet and gymnastics. It is interesting to find that this great philosopher recommended music to restore the harmony of the spirits. Besides the magic virtues of the dill, he held that many other plants possessed them, such as the cabbage (a food in great favour with the Pythagoreans), the squill, and anise. He held that surgery was not to be practised, as it is unlawful, but salves and poultices were to be permitted. His disciples attributed the union between medicine and philosophy to him.

The Pythagorean philosophy turns upon the idea of numbers and the mathematical relations of things. "All things are number;" "number is the essence of everything." The world subsists by the principle of ordered numbers. The spheres revolve harmoniously; the

¹ Diodor., i. 69, 98.² Grote, vol. iv. p. 529.³ Book xx. 73.

seven planets are the seven golden chords of the heavenly heptachord. As a corollary to this notion we have the theory of opposites. We have the odd and even, and their combinations. The even is the unlimited, the odd the limited; so all things are derived from the combination of the limited and the unlimited. Then we get the limited and the unlimited, the odd and the even, the one and many, right and left, masculine and feminine, rest and motion, straight and crooked, light and darkness, good and evil, square and oblong. When opposites unite, there is harmony. The number ten comprehends all other numbers in itself; four was held in great respect, because it is the first square number and the potential decade ($1 + 2 + 3 + 4 = 10$). Pythagoras was the discoverer of the holy τετρακτύς, "the fountain and root of ever-living nature." Five signifies marriage, one is reason because unchangeable, two is opinion, seven is called παρθένος and Ἀθήνη, because within the decade it has neither factors nor product.¹

The doctrine of transmigration of souls, metempsychosis, is Pythagoras's. He probably borrowed it from the Orphic mysteries; originally no doubt it came from Asia. Asceticism, mysticism, and Neoplatonism sprang from this noble and lofty philosophy. Closely connected with his theory of numbers he held that from these points are produced, from these lines, from lines figures, and from figures solid bodies. The elements fire, water, earth, and air, account in his conception for the formation of the world. He understood the structure of the body, its procreation and development. He believed that the animal soul is an emanation from the world-soul; the universal soul is God, author of himself. Demons are an order of beings between the highest and the lowest. Striving for the good brings moral health. Bodily health means harmony, disease means discord. Diseases are caused by demons, and are to be dispelled by prayers, offerings, and music. He first among the Greeks taught the immortality of the soul; he held a doctrine of rewards and punishments, and taught that of metempsychosis. For many succeeding ages the Pythagorean doctrine had the greatest influence on the art of medicine.²

Le Clerc says that Pythagoras obtained his ideas of the climacteric years from the Chaldæans. The term is applied to the seventh year of the life of man, and it was anciently believed that at each change we incur some risk to life or health, on account of the bodily changes undergone at that time.³ Celsus says that the medical sentiment with

¹ See "Pythagorean Philosophy," *Ency. Brit.*

² Baas, *Hist. Med.*, p. 89. Meryon, *Hist. Med.*, p. 14. Dr. Adams, *Introd. Hippoc.*, vol. i. p. 134.

³ *Histoire de la Médecine*, Pt. I., liv. i., c. iv.

respect to the septenary number in diseases, and that of the odd and even days, is of Pythagorean origin.¹ The Pythagoreans had a great respect for the number four. The quaternary number was sacred to the Egyptians; they burned in the temples of Isis a kind of resinous gum, myrrh, and other drugs, in the preparation of which they had regard to the number four. The Israelites imitated them in this respect (Exod. xxx. 2).²

The sacred bean of Pythagoras was the object of religious veneration in Egypt; the priests were commanded not to look upon it. It is thought to have been the East Indian *Nelumbium*.³

ZAMOLXIS, who was a god to the Getans, is supposed by some to have been a slave and disciple of Pythagoras; by others he is considered an altogether mythical personage. He is credited by those who believe him to have been a physician with having said that "A man could not cure the eyes without curing the head, nor the head without all the rest of the body, nor the body without the soul." Plato said much the same thing when he remarked, "To cure a headache you must treat the whole man." Zamolxis cured the soul, not by the enchantments of magic, but by wise discourse and reasonable conversation. "These discourses," said Plato, "produce wisdom in the soul, which having once been acquired it is easy after that to procure health both for the head and all the rest of the body."

DEMOCEDES was a celebrated physician of Crotona, in Magna Grecia, who lived in the sixth century B.C. He went to practise at Ægina, where he received from the public treasury a sum equal to about £344 a year for his services. The next year he went to Athens at a salary equal to £406, and the following year he went to the island of Samos. The tyrant Polycrates gave him the salary of two talents. He was carried prisoner to Susa to the court of Darius, where he acquired a great reputation and much wealth by curing the king's foot and the breast of the queen. It is recorded that Darius ordered the surgeons who had failed to cure him to be put to death, but Democedes interceded for and saved them. He ultimately escaped to Crotona, where he settled, the Persians having in vain demanded his return.⁴ He wrote a work on medicine.

DEMOCRITUS, of Abdera, was a contemporary of Socrates; he was born between 494 and 460 B.C., and was one of the founders of the Atomic philosophy. He was profoundly versed in all the knowledge of his time. So ardent a student was he, that he once said that he preferred the discovery of a true cause to the possession of the kingdom of

¹ Lib. 3, cap. 4.

² Sprengel, *Hist. Mtd.*, p. 36.

³ Pratt, *Flowering Plants*, vol. i. p. 57.

⁴ Herod., iii. 137.

Persia. The highest object of scientific investigation he held to be the *discovery of causes*. He wrote on medicine, and devoted himself zealously to the study of anatomy and physiology. Pliny says that he composed a special treatise on the structure of the chameleon.¹ He wrote on canine rabies, and on the influence of music in the treatment of disease. He is, however, best known to science on account of his cosmical theory. All that exists is vacuum and atoms. The atoms are the ultimate material of all things, even of spirit. They are uncaused and eternal, invisible, yet extended, heavy and impenetrable. They are in constant motion, and have been so from all eternity. By their motion the world and all it contains was produced. Soul and fire are of the same nature, of small, smooth, round atoms, and it is by inhaling and exhaling these that life is maintained. The soul perishes with the body. He rejected all theology and popular mythology. Reason had nothing to do with the creation of the world, and he said, "There is nothing true; and if there is, we do not know it." "We know nothing, not even if there is anything to know." He died in great honour, yet in poverty, at an advanced age (some writers say at 109 years). His knowledge of nature, and especially of medicine, caused him to be considered a sorcerer and a magician. There was a tradition that he deprived himself of his sight in order to be undisturbed in his intellectual speculations. He probably became blind by too close attention to study. Another story was that he was considered to be insane, and Hippocrates was sent for to cure him.

The great philosophers of ancient Greece believed that all the elements are modifications of one common substance, called the primary matter, which they demonstrated to be devoid of all quality and form, but susceptible of all qualities and forms. It is everything in capacity, but nothing in actuality. Matter is eternal; the elements are the first matter arranged into certain distinguishing forms. Some of the early philosophers held that all the materials which compose the universe existed in a fluid form; they understood by fire, matter in a highly refined state, and that it is the element most intimately connected with life, some even considering it the very essence of the soul. "Our souls are fire," says Phornutus. "What we call heat is immortal," says one of the Hippocratic writers, "and understands, sees, and hears all things that are or will be."²

Bacon explains the ancient fable of Proteus as signifying matter, a something which, being below all forms and supporting them, is yet different from them all.

¹ *Hist. Nat.*, xxviii. c. 29.

² *De Carnibus*.

Sir Isaac Newton is not widely different from Strabo when he says that all bodies may be convertible into one another.

Commenting upon these opinions of the Greek philosophers, Dr. Adams says, in his introduction to the works of Hippocrates :¹ "If every step which we advance in the knowledge of the intimate structure of things leads us to contract the number of substances formerly held to be simple, I would not wonder if it should yet turn out that oxygen, carbon, hydrogen, and nitrogen are—like what the ancients held the elements to be—all nothing else but different modifications of one ever-changing matter."

The theories of the Greek philosophers on the elements are poetically summed up in Ovid's *Metamorphoses* :—

"Nor those which elements we call abide,
Nor to this figure nor to that are ty'd :
For this eternal world is said of old
But four prolific principles to hold,
Four different bodies ; two to heaven ascend,
And other two down to the centre tend.
Fire first, with wings expanded, mounts on high,
Pure, void of weight, and dwells in upper sky ;
Then air, because unclogged, in empty space
Flies after fire, and claims the second place ;
But weighty water, as her nature guides,
Lies on the lap of earth ; and mother Earth subsides.
All things are mixed of these, which all contain,
And into these are all resolved again ;
Earth rarifies to dew ; expanding more,
The subtle dew in air begins to soar ;
Spreads as she flies, and, weary of the name,
Extenuates still, and changes into flame.
Thus having by degrees perfection won,
Restless, they soon untwist the web they spun,
And fire begins to lose her radiant hue,
Mixed with gross air, and air descends in dew !
And dew condensing, does her form forego,
And sinks, a heavy lump of earth, below.
Thus are their figures never at a stand,
But changed by Nature's innovating hand."²

GREEK THEORIES OF DISEASE.

As the Greeks believed that all diseases were the consequences of the anger of the gods, it was in their temples that cures were most likely to take place. Faith was the *sine quâ non* in the patient, and everything about the temple and its ceremonies was calculated to

¹ Vol. i. p. 151.

² Ovid's *Metamorph.*, Dryden's translation, Book XV.

excite religious awe and to stimulate faith. Preliminary purifications, fasting, massage, and fomentations with herbs, were necessary parts of the initiatory ceremonies, and the imagination was excited by everything that the sufferer saw around him. He heard the stories of the marvellous cures which had taken place at the sacred fane. Tablets round the walls, placed there by grateful worshippers who had been cured in the past,¹ served to fill the mind with hope, when, as was the practice, the patient lay down in the holy place by the image of the healing god, that in the incubatory sleep the remedies which were to cure him might be revealed. Sometimes no such revelation was vouchsafed, then sacrifices and prayers were offered; if these failed, the priests themselves would appear in the mask and the dress of the healing god, and in the darkness and mystery of the night reveal the necessary prescriptions. To interpret the dreams was the task of the priests at all times, just as it was in the temples of ancient Egypt. Divination, magic, and astrology largely assisted in the work of discovering the requisite remedies. If all failed, it was due not to any defect on the part of the divinity or his servants, but simply to the want of faith on the part of the patient. The festivals of Æsculapius were called Asclepia, and the presiding priests of the healing god were named Asclepiades. The schools of the Asclepiades were a sort of medical guild, and their doctrines were divided into exoteric and esoteric. They naturally became possessed of a great body of medical teaching, which was preserved as a precious secret and handed down from generation to generation. The Asclepiadæ thus became the hereditary physicians of Greece. Medicine at this period was not a science to be taught to all comers, but was a mystery to be orally transmitted. These men pretended to be descendants of Æsculapius, just as now the imitators of medicines, perfumes,

¹ The following are translations of some of the tablets suspended in the temples, as given in Hieron Mercurialis (*De Art. Gymnast.*, Amstel., 4to, 1672, pp. 2, 3) :—

"Some days back a certain Caius, who was blind, learned from an oracle that he should repair to the temple, put up his fervent prayers, cross the sanctuary from right to left, place his five fingers on the altar, then raise his hand and cover his eyes. He obeyed, and instantly his sight was restored, amidst the loud acclamations of the multitude. These signs of the omnipotence of the gods were shown in the reign of Antoninus."

"A blind soldier, named Valerius Apes, having consulted the oracle, was informed that he should mix the blood of a white cock with honey, to make up an ointment to be applied to his eyes for three consecutive days. He received his sight, and returned public thanks to the gods."

"Julian appeared lost beyond all hope from a spitting of blood. The gods ordered him to take from the altar some seeds of the pine, and to mix them with honey, of which mixture he was to eat for three days. He was saved, and came to thank the gods in presence of the people."—(Smith's *Dict. Greek and Roman Ant.*, art. "Medicina.")

etc., which have become celebrated, give out that they belong to the family of the inventor, and thus know the secrets of the preparation.¹

This professional class was quite distinct from the priests of the Æsculapian temples, though many writers have confused them. Probably the truth is this :—Certain students from reading the votive tablets in the temples, and examining the persons who came to be cured, gave their attention to the art of medicine, and established themselves as physicians in the neighbourhood of the temples ; for it does not appear that the priests themselves pretended to medical skill. They were the instruments of the divine revelation, the mediums of the healing power of the god ; they suggested remedies, but did not attempt their application or the treatment of cases. In process of time the pilgrims to the temples would require human aid to supplement the often disappointing divine assistance, and this the Asclepiadæ were appointed to supply. Hypnotism was probably practised ; music, and such drugs as hemlock were also employed which soothe the nervous system and relieve pain. The Asclepiadæ took careful notes of the symptoms and progress of each case, and were particular to observe the effect of the treatment prescribed ; they became, in consequence, exceedingly skilful in prognosis. Galen says that little attention was paid to dietetics by the Asclepiads ; but Strabo speaks of the knowledge which Hippocrates derived from the documents in the Asclepion of Cos.² Exercise, especially on horseback, was one of the measures used by the Asclepiads for restoring the health.³

SCHOOLS OF THE ASCLEPIADES.

The three most famous schools of the Asclepiades were those of Rhodes, Cos, and Cnidos. There were also that of Crotona, in Lower Italy, established by Pythagoras, and the school of Cyrene, in the North of Africa. Famous temples of Æsculapius existed at Titanæ, Epidaurus, Oroe, Cyllene, Tithorea, Tricca, Megalopolis, Pergamus, Corinth, Smyrna, and at many other places.⁴

A spirit of healthy emulation existed in these different schools, which was most advantageous for the progress of medical science. The tone existing at this early period amongst the different medical societies at these institutions is shown in the famous oath which the pupils of the Asclepiadæ were compelled to subscribe on completing their course of instruction in medicine. It is the oldest written monument of the Greek art of healing.⁵

¹ The multitude of "Eau de Cologne" makers calling themselves "Farina" is a case in point. ² Adams, *Hippocrates*, vol. i. p. 7. ³ Galen, *De Sanitate tuenda*.

⁴ Meryon, *Hist. Med.*, p. 11.

⁵ Baas, *Hist. Med.*, p. 91.

THE OATH.

"I swear by Apollo, the physician, and Æsculapius, and Health, and Panacea,¹ and all the gods and goddesses, that, according to my ability and judgment, I will keep this oath and this stipulation—to reckon him who taught me this art equally dear to me as my parents, to share my substance with him, and relieve his necessities if required; to look upon his offspring in the same footing as my own brothers, and to teach them this art, if they shall wish to learn it, without fee or stipulation; and that by precept, lecture, and every other mode of instruction, I will impart a knowledge of the art to my own sons, and those of my teachers, and to disciples bound by a stipulation and oath according to the law of medicine, but to none others. I will follow that system of regimen which, according to my ability and judgment, I consider for the benefit of my patient, and abstain from whatever is deleterious and mischievous. I will give no deadly medicine to any one if asked, nor suggest any such counsel; and in like manner I will not give to a woman a pessary to produce abortion. With purity and with holiness I will pass my life and practise my art. I will not cut persons labouring under the stone, but will leave this to be done by men who are practitioners of this work.²

"Into whatever houses I enter, I will go into them for the benefit of the sick, and will abstain from every voluntary act of mischief and corruption; and, further, from the seduction of females or males, of freemen or slaves. Whatever, in connection with my professional practice, or not in connection with it, I see or hear, in the life of men, which ought not to be spoken of abroad, I will not divulge, as reckoning that all such should be kept secret. While I continue to keep this oath unviolated, may it be granted to me to enjoy life and the practice of the art, respected by all men, in all times! But should I trespass and violate this oath, may the reverse be my lot!"

Ancient authorities differ as to the respective order in which the schools of the Asclepiads should be esteemed. Rhodes, Cos, and Cnidos continually disputed for the pre-eminence, Cos and Cnidos

¹ All-heal.

² Dr. Puschmann, in his *History of Medical Education*, p. 42, translates this passage: "Castration will I not carry out even on those who suffer from stone, but leave this to those people who make a business of it." The words in the Greek are οὐ τεμέω δὲ οὐδὲ μὴν λιθοῶντας, and much controversy has been excited by them. Some commentators of great authority think the passage forbids castration, as disgraceful things are being spoken of, such as giving poisons and procuring abortion. Certainly there is no reason for supposing that the doctors of the period would object to perform lithotomy, though it is the fact that there was a class of operators who were a sort of unscientific specialists in the practice.

acquiring great fame by their conflicting opinions. According to Galen, the first place must be conceded to Cos, as having produced the greatest number of excellent disciples, amongst whom was Hippocrates; he ranks Cnidos next. Cos (B.C. 600) was the objective school, and devoted its studies chiefly to symptomatology. It asked, what can we see of the patient's disorder? of what does he complain? what, in fact, are his symptoms? This is practical medicine, though not so much in accordance with modern scientific medicine as the method of Cnidos, the subjective school. There the aim was to make a correct diagnosis; to find out what was behind the symptoms, what caused the morbid appearances; what it was that the sensations of the patient indicated; and its aim was not to treat symptoms so much as to treat vigorously the disorder which caused them. Auscultation, or the art of scientifically listening to the sounds of the chest, those of the lungs in breathing, and of the heart in beating, was to some extent understood and practised at Cnidos. The medical school of Crotona was in the highest repute 500 B.C., probably on account of its connection with the Pythagoreans. The school of Rhodes does not seem to have had a long life.

That of Cyrene was famous on account not only of its medical teaching, but from the fact that mathematics and philosophy were industriously pursued there. The teaching in all these schools must have been of a very high order; for, though unfortunately little of it has descended directly to us, we have sufficient evidence of its importance in such fragments as are to be found incorporated with the works of Hippocrates, such as the *Coan Prognostics* and the *Cnidian Sentences*; the former, a miscellaneous collection of the observations made by the physician of Cos, and the latter, a work attributed to Euryphon, a celebrated physician of Cnidos (about the former half of the fifth century B.C.).

Experiment and observation were insisted upon in the study of anatomy and physiology. Galen tells us in his second book, *On Anatomical Manipulations*: "I do not blame the ancients, who did not write books on anatomical manipulations; though I praise Marinus, who did. For it was superfluous for them to compose such records for themselves or others, while they were, from their childhood, exercised by their parents in dissecting, just as familiarly as in writing and reading; so that there was no more fear of their forgetting their anatomy than of their forgetting their alphabet. But when grown men, as well as children, were taught, this thorough discipline fell off; and, the art being carried out of the family of the Asclepiads, and declining by repeated transmission, books became necessary for the student."

The method of the Asclepiadæ was one of true induction; much was

imperfect in their efforts to arrive at the beginning of medical science. They had little light, and often stumbled ; but they made the best use of what they had, and with all their deviations they always returned to the right path, and kept their faces towards the light. Hippocrates was of them ; and Bacon of Verulam, in the centuries to come, followed and developed the same method. Dr. Adams remarks the assiduous observation and abundant rational experience which led them to enunciate such a law of nature as this : "Those things which bring alleviation with bad signs, and do not remit with good, are troublesome and difficult."

CTESIAS, of Cnidus, in Caria, was a physician at the court of King Artaxerxes Mnemon. He may be called a contemporary of Herodotus. It is possible that, according to Diodorus, he was a prisoner of war while in Persia, though the well-known fact that Greek physicians were in great request, and were always received there with favour, is quite sufficient to account for his presence in that country. He wrote a history of Persia and a treatise on India, containing many statements formerly considered doubtful, but now proved to be founded on facts.

The persons who anointed the bodies of the athletes of ancient Greece, preparatory to their entering the gymnasia, were called ALIPTÆ. These persons taught gymnastic exercises, practised many operations of surgery, and undertook the treatment of trifling diseases. The external use of oil was intended to close the pores of the skin, so as to prevent excessive perspiration. The oil was mixed with sand, and was well rubbed into the skin. After the exercises, the athletes were again anointed, to restore the tone of the muscles. The aliptæ would naturally acquire considerable knowledge of the accidents and maladies to which the human body was subject ; accordingly, we find that they not only undertook the treatment of fractures and dislocations, but became the regular medical advisers of their patrons. ICCUS of Tarentum devoted himself to dietætics. They were probably a superior class of trainers. HERODICUS of Selymbria, a teacher of Hippocrates, treated diseases by exercises. He is said to have been the first to demand a fee in place of the presents which were given by patients formerly to their doctors.¹ The gymnasia were dedicated to Apollo, the god of physicians.² The directors of the institutions regulated the diet of the young men, the sub-directors prescribed for their diseases.³ The inferiors, or bathers, bled, gave clysters, and dressed wounds.⁴

¹ Baas, *Hist. Med.*, p. 93.

² Plato, *De Leg.*, xi.

³ Plut., *Symp.*, viii. 4, § 4.

⁴ *Ibid.*, iv.

CHAPTER II.

THE MEDICINE OF HIPPOCRATES AND HIS PERIOD.

Hippocrates first delivered Medicine from the Thralldom of Superstition.—Dissection of the Human Body and Rise of Anatomy.—Hippocrates, Father of Medicine and Surgery.—The Law.—Plato.

HIPPOCRATES, the "Father of Medicine," was born at Cos,¹ 460 B.C. On his father's side he was believed to be descended from Æsculapius, and through his mother from Hercules. A member of the family of the Asclepiadæ, of a descent of three hundred years, he had the advantage of studying medicine under his father, Heraclides, in the Asclepion of Cos. Herodicus of Selymbria taught him medical gymnastics, and Democritus of Abdera and Gorgias of Leontini were his masters in literature and philosophy. He travelled widely, and taught and practised at Athens, dying at an age variously stated as 85, 90, 104, and 109. Fortunate in the opportunities offered by his birth and position, he was still more fortunate in his time—the age of Pericles—in which Greece reached its noblest development, and the arts and sciences achieved their greatest triumphs. It was the age of Socrates, Plato, Xenophon, Euripides, Sophocles, Æschylus, Pindar, Aristophanes, Herodotus, Thucydides, and Phidias. Philosophy, poetry, literature, and sculpture found in these great minds their most perfect exponents. Medicine, in the person of Hippocrates, was to find its first and most distinguished author-physician.

The Father of Medicine was therefore the worthy product of his remarkable age. The genius which culminated in the works of the golden age of Greece could scarcely have left medicine without her Hippocrates; the harmony otherwise would have been incomplete.

The following genealogy of Hippocrates has been given by Tzetzes, but Mr. Grote says it is wholly mythical:—

Æsculapius was the father of Podalirius, who was the father of Hippolochus, who was the father of Sostratus, who was the father of Cleomyttades, who was the father of Theodorus, who was the father of

¹ Cos gave birth to Ptolemy Philadelphus, the second of the Greek kings of Egypt, to Ariston the philosopher, and to Apelles the painter.

Sostratus II., who was the father of Theodorus II., who was the father of Sostratus III., who was the father of Nebrus, who was the father of Gnosidicus, who was the father of Hippocrates I., who was the father of Heraclides, who was the father of Hippocrates II., otherwise called the Great Hippocrates.

Hippocrates was the first physician who delivered medicine from the thralldom of superstition and the sophistries of philosophers, and gave it an independent existence. It was impossible that our science should make progress so long as men believed that disease was caused by an angry demon or an offended divinity, and was only to be cured by expelling the one or propitiating the other. Hippocrates, with a discernment and a courage which was marvellous, considering his time, declared that no disease whatever came from the gods, but was in every instance traceable to a natural and intelligible cause. Before the Asclepiadæ there was no medical science ; before Hippocrates there was no one mind with vision wide enough to take in all that had been done before—to select the precious from the worthless and embody it in a literature which remains to the present time a model of conciseness and condensation, and a practical text-book on all that concerns the art of healing as it was understood in his time. The minuteness of his observations, his rational and accurate interpretation of all he saw, and his simple, methodical, truthful, and lucid descriptions of everything which he has recorded excite the admiration and compel the praise of all who have studied the works which he has left. Nor are his candour, honesty, caution, and experience less to be extolled. He confesses his errors, fully explains the measures adopted to cure his cases, and candidly admits that in one series of forty-two patients whom he attended only seventeen recovered, the others having perished in spite of the means he had proposed to save them. He was probably the first public teacher of the healing art ; his counsels were not whispered in the secret meetings of sacerdotal assemblies. He was the first to disclose the secrets of the art to the world ; to strip it of the veil of mystery with which countless generations of magicians, thaumaturgists, and priestly healers had shrouded it, and to stand before his pupils to give oral instruction in anatomy and the other branches of his profession. Had he not been the Father of Medicine, he would have been known as one of the greatest of the philosophers. He first recognised *Φύσις*—Nature in the treatment of disease. Nature, he declared, was all-sufficient for our healing. She knows of herself all that is necessary for us, and so he called her “the just.” He attributed to her a faculty, *Δύναμις* ; physicians are but her servants. The governing faculty, *Δύναμις*, nourishes, preserves, and increases all things.

Galen states that the greater part of Aristotle's physiology was taken from Hippocrates. It has been the custom to make light of his anatomical knowledge, and to say that in face of the difficulty, if not impossibility, of procuring subjects for dissection, he could have had but little exact knowledge of the human body ; but it is certain that by some means or other he must have dissected it. In proof of this it is only necessary to mention his treatise *On the Articulations*, especially that part of it which relates to the dislocation of the shoulder joint. Dr. Adams, in one of his valuable notes on the works of Hippocrates,¹ says: "The language of our author in this place puts it beyond all doubt that human dissection was practised in his age." In Ashurst's *International Encyclopædia of Surgery*² his descriptions of all dislocations are declared to be wonderfully accurate ; and the writer adds that it is the greatest error imaginable to suppose, with the common conceit of our day, that all ingenious and useful improvements in surgery belong to the present age. In the treatise on the Sacred Disease (epilepsy), his description of the brain in man proves that he was acquainted with its dissection.

In the treatise on the heart, again, the construction of that organ in the human body is referred to. Other allusions to the internal structure of the human frame in the Hippocratic treatises serve to confirm our opinion ; and if it be objected that some of these are probably not genuine, they must at least be as old as his period, and it was far more likely that he should have written or inspired them than that they should have emanated from an inferior source. Those who argue to the contrary do so on the same grounds as the Greek commentators, who say that the *Iliad* and *Odyssey* were not written by Homer, but by some other poet of the same name. Dr. Adams is confident, from his familiarity with the works of Hippocrates, that the knowledge of human anatomy exhibited therein had its origin in actual dissection, and he adds that : "I do not at present recollect a single instance of mistake committed by him in any of his anatomical descriptions, if we except that with regard to the sutures of the head, and even in that case I have endeavoured to show that the meaning of the passage is very equivocal."³ There is no doubt, in fact, that a great deal more human dissection went on than the Greek doctors dared to acknowledge for fear of exciting popular prejudice. Less than a hundred years after the death of Hippocrates there was abundant and open dissection of the human body in the schools of Alexandria, and it is incredible that the practice only received popular sanction at that particular time. Yet the

¹ Vol. ii. p. 569.

² Vol. vi. p. 1152.

³ *Works of Hippocrates*, Syd. Soc., vol. ii. p. 565.

anatomy of Hippocrates was very imperfect. The nerves, sinews, and ligaments were confounded together, all being classed as νεῦρον or τόμος.

The blood-vessels were supposed to contain both blood and air, and were called φλέβες; the trachea was called an "artery."

The brain was considered as merely a gland which condenses the ascending vapours into mucus. The office of the nerves was to convey the animal spirits throughout the body. We must not forget that the science of anatomy was extremely imperfect even at the beginning of the present century.

"When," says Littré,¹ "one searches into the history of medicine and the commencement of the science, the first body of doctrine that one meets with is the collection of writings known under the name of the works of Hippocrates. The science mounts up directly to that origin, and there stops. Not that it had not been cultivated earlier, and had not given rise to even numerous productions; but everything that had been made before the physician of Cos has perished. We have only remaining of them scattered and unconnected fragments. The works of Hippocrates have alone escaped destruction; and by a singular circumstance there exists a great gap after them as well as before them. The medical works from Hippocrates to the establishment of the school of Alexandria, and those of that school itself, are completely lost, except some quotations and passages preserved in the later writers; so that the writings of Hippocrates remain alone amongst the ruins of ancient medical literature."

It is vain to inquire how Hippocrates acquired a knowledge which seems to us so far in advance of his age. Was Greek wisdom derived from the East, or was its philosophy the offspring of the soil of Hellas? Such questions have often been discussed, but to little purpose. There would seem to be every reason to suppose that Greek medicine was indigenous. We have no means of knowing how long philosophy and medicine had been united before the time of Hippocrates. The honour of affecting the alliance has been ascribed to Pythagoras.

Several of the Greek philosophers speculated about medicine. We have seen that besides Pythagoras, Empedocles and Democritus did so, although it is not probable that they followed it as a profession. The Asclepiadæ probably brought medicine to a high state of perfection, but the work these priest-physicians did is a sealed book to us. All was darkness till Hippocrates appeared.

In his treatise *On Ancient Medicine*, he says that men first learned from experience the science of dietetics; they were compelled to

¹ *Œuvres Complètes d'Hippocrate*, Tom. I., Introd., ch. i. p. 3.

ascertain the properties of vegetable productions as articles of food. Then they learned that the food which is suitable in health is unsuitable in sickness, and thus they applied themselves to the discovery of the proper rules of diet in disease ; and it was the accumulation of the facts bearing on this subject which was the origin of the art of medicine. "The basis of his system was a rational experience, and not a blind empiricism ; so that the empirics in after ages had no good grounds for claiming him as belonging to their sect."¹

He assiduously applied himself to the study of the natural history of diseases, especially with the view to determine their tendencies to death or recovery. In every case he asked himself what would be the probable end of the disorder if left to itself. Prognosis, then, is one of the chief characteristics of Hippocratic medicine. He hated all charlatanism, and was free from all popular superstition. When we reflect on the medicine of the most highly civilized nations which we have considered at length in the preceding pages, and remember how full of absurdities, of magic, amulet lore, and other things calculated to impose on the credulity of the people, were their attempts at healing, we shall be inclined to say, that the most wonderful thing in the history of Hippocrates was his complete divorce from the evil traditions of the past. Although he forsook philosophy as an ally of medicine, his system was founded in the physical philosophy of the elements which the ancient Greeks propounded, and which we have attempted to explain. There was an all-pervading spiritual essence which is ever striving to maintain all things in their natural condition ; ever rectifying their derangements ; ever restoring them to the original and perfect pattern. He called that spiritual essence Nature. "Nature is the physician of diseases."² Here, then, we have the enunciation of the doctrine of the *Vis Medicatrix Naturæ*. In his attempts to aid Nature, the physician must regulate his treatment "to do good, or at least, to do no harm" ;³ yet he bled, cupped, and scarified. In constipation he prescribed laxative drugs, as mercury (not the mineral, of course, but *Mercurialis perennis*), beet, and cabbage, also elaterium, scammony, and other powerful cathartics. He used white hellebore boldly, and when narcotics were required had recourse to mandragora, henbane, and probably to poppy-juice.

He is said to have been the discoverer of the principles of derivation and revulsion in the treatment of diseases.⁴

¹ Adams, *Hippocrates*, vol. i. p. 18.

² *Epidem.*, vi.

³ *Ibid.*, i.

⁴ Derivation is the drawing of humours from one part of the body to another, as from the eye by a blister on the neck ; revulsion differs from this only by the force of the medicine and the distance of the disorder from the part to which it is applied. He

Sydenham called Hippocrates "the Romulus of medicine, whose heaven was the empyrean of his art. He it is whom we can never duly praise." He terms him "that divine old man," and declares that he laid the immovable foundations of the whole superstructure of medicine when he taught that *our natures are the physicians of our diseases*.¹

He was Father of Surgery as well as of medicine. Eight of his seventeen genuine works are strictly surgical. By an ingenious arrangement of apparatus he was enabled to practise extension and counter-extension. He insisted on the most exact co-aptation of fractured bones, declaring that it was disgraceful to allow a patient to recover with a crooked or shortened limb. His splints were probably quite as good as ours, and his bandaging left nothing to be desired. When the ends of the bones projected in cases of compound fractures, they were carefully resected. In fracture of the skull with depressed bone the trepan was used, and in cases where blood or pus had accumulated they were skilfully evacuated. He boldly and freely opened abscesses of the liver and kidneys. The thoracic cavity was explored by percussion and auscultation for detection of fluids, and when they were discovered paracentesis (tapping) was performed. This was also done in cases of abdominal dropsies. The rectum was examined by an appropriate speculum, fistula-in-ano was treated by the ligature, and hæmorrhoids were operated upon. Stiff leather shoes and an admirable system of bandaging were employed in cases of talipes. The bladder was explored by sounds for the detection of calculi; gangrenous and mangled limbs were amputated; the dead fœtus was extracted from the mother. Venesection, scarification, and cupping were all employed.²

He resected bones at the joints. In the treatment of ulcers he used sulphate of copper, sulphate of zinc, verdigris, lead, sulphur, arsenic, alum, etc. He came very near indeed to the antiseptic system in surgery when he made use of "raw tar water" (a crude sort of carbolic acid, in fact) in the treatment of wounds. Suppositories were employed.

In Dr. Adams' *Life of Hippocrates*,³ he says: "In surgery he was a bold operator. He fearlessly, and as we would now think, in some cases unnecessarily, perforated the skull with the trepan and the trephine in injuries of the head. He opened the chest also in empyema and hydrothorax. His extensive practice, and no doubt his great

treated fevers by preparations which increase the amount of fluid in the blood, as by water, buttermilk, whey, etc. This was called the diluent system. At the same time he used mild aperients and sometimes venesection.

¹ Νούσων φύσις ἐτηρὸς. *Epid.*, vi. 5, l. t. iii. p. 606.

² See for all this surgical information Ashurst's *International Encyclopædia of Surgery*, vol. vi.

³ *Genuine Works of Hippocrates*, vol. i. pp. 20, 21.

familiarity with the accidents occurring at the public games of his country, must have furnished him with ample opportunities of becoming acquainted with dislocations and fractures of all kinds; and how well he had profited by the opportunities which he thus enjoyed, every page of his treatises *On Fractures* and *On the Articulations* abundantly testifies. In fact, until within a very recent period, the modern plan of treatment in such cases was not at all to be compared with his skilful mode of adjusting fractured bones, and of securing them with waxed bandages. In particular, his description of the accidents which occur at the elbow and hip-joints will be allowed, even at the present day, to display a most wonderful acquaintance with the subject. In the treatment of dislocations, when human strength was not sufficient to restore the displacement, he skilfully availed himself of all the mechanical powers which were then known. In his views with regard to the nature of club-foot, it might have been affirmed of him a few years ago that he was twenty-four centuries in advance of his profession, when he stated that in this case there is no dislocation, but merely a declination of the foot; and that in infancy, by means of methodical bandaging, a cure may in most cases be effected without any surgical operation. In a word, until the days of Delpech and Stromeyer, no one entertained ideas so sound and scientific on the nature of this deformity as Hippocrates."

Dr. Adams, recapitulating the general results of the investigations as to the genuineness of the Hippocratic books, states that a considerable portion of them are not the work of Hippocrates himself. The works almost universally admitted to be genuine are: *The Prognostics*, *On Airs*, etc., *On Regimen in Acute Diseases*, seven of the books of *Aphorisms*, *Epidemics*, I. and III., *On the Articulations*, *On Fractures*, *On the Instruments of Reduction*, *The Oath*.

The following are almost certainly genuine: *On Ancient Medicine*, *On the Surgery*, *The Law*, *On Ulcers*, *On Fistule*, *On Hæmorrhoids*, *On the Sacred Disease*.¹

THE LAW.

1. Medicine is of all the arts the most noble; but owing to the ignorance of those who practise it, and of those who, inconsiderately, form a judgment of them, it is at present far behind all the other arts. Their mistake appears to me to arise principally from this, that in the cities there is no punishment connected with the practice of medicine (and with it alone) except disgrace, and that does not hurt those who

¹ Adams, *Genuine Works of Hippocrates*, vol. i. pp. 129, 130.

are familiar with it. Such persons are like the figures¹ which are introduced in tragedies, for as they have the shape, and dress, and personal appearance of an actor, but are not actors, so also physicians are many in title but very few in quality.

2. Whoever is to acquire a competent knowledge of medicine, ought to be possessed of the following advantages : a natural disposition ; instruction ; a favourable position for the study ; early tuition ; love of labour ; leisure. First of all, a natural talent is required ; for when nature opposes, everything else is vain ; but when nature leads the way to what is most excellent, instruction in the art takes place, which the student must try to appropriate to himself by reflection, becoming an early pupil in a place well adapted for instruction. He must also bring to the task a love of labour and perseverance, so that the instruction taking root may bring forth proper and abundant fruits.

3. Instruction in medicine is like the culture of the productions of the earth. For our natural disposition is, as it were, the soil ; the tenets of our teacher are, as it were, the seed ; instruction in youth is like the planting of the seed in the ground at the proper season ; the place where the instruction is communicated is like the food imparted to vegetables by the atmosphere ; diligent study is like the cultivation of the fields ; and it is time which imparts strength to all things and brings them to maturity.

4. Having brought all these requisites to the study of medicine, and having acquired a true knowledge of it, we shall then, in travelling through the cities, be esteemed physicians not only in name but in reality. But inexperience is a bad treasure, and a bad friend to those who possess it, whether in opinion or reality, being devoid of self-reliance and contentedness, and the nurse both of timidity and audacity. For timidity betrays a want of power, and audacity a want of skill. There are, indeed, two things, knowledge and opinion, of which the one makes its possessor really to know, the other to be ignorant.

5. Those things which are sacred are to be imparted only to sacred persons ; and it is not lawful to impart them to the profane until they have been initiated in the mysteries of the science.

The "Hippocratic collections" of works which have been attributed to Hippocrates, but the greater part of which were neither written by him, nor compiled from notes taken by his students, consists of eighty-seven treatises.

Hippocrates believed in the influence of the imagination of pregnant women on the child in the womb. He forbade nurses to eat food of an

¹ Probably masks or inanimate figures (Adams).

acid, salt, or acid nature, and observed that infants during the period of dentition were liable to fevers, bowel troubles, and convulsions, especially if there was constipation. He mentions thrush as one of the diseases of dentition (*De Dent.*). He recommends friction for contracting or relaxing the body according as it is applied in a hard or soft manner. Very fully he discourses on the evil effects of plethora, and recommends purging, emetics, warm baths, and bleeding, for reducing the system (*De Dietol.*, iii. 16 *et seq.*). He constantly advises gentle purgatives as a means of keeping the body in health. His favourite laxative medicine was the herb mercury. The administration of clysters is recommended; this treatment was evidently derived from the Egyptians. What are called errhines or sternutatories—*i.e.*, medicines which, applied to the nose, excite sneezing—were described by Hippocrates as medicines which purge the head. Though he fully describes the effects of baths, he speaks unfavourably of thermal springs as being hard and heating. He insists that the diet should be full in winter and spare in summer (*Aphor.*, i. 18). He disapproves of the habit of eating a full dinner (*De Vet. Med.*). He condemns the use of new bread. The nutritious properties of pulse in general are insisted upon. He calls the flesh of fowls one of the lightest kinds of food (*De Affect.*, 46), and says that eggs are nutritious, and strengthening, but flatulent. He remarks that the flesh of wild animals is more digestible than that of domesticated. He objects to goat's flesh as having all the bad qualities of beef, which he calls a strong, astringent, and indigestible article of diet. Milk, he says, sometimes causes the formation of stones in the bladder (*De Ær. Aquis et Locis*, 24). Dr. Francis Adams says this opinion was adopted by all the ancient physicians. Cheese he considers flatulent and indigestible. Fishes are light food; sea fish are lighter and better for delicate persons than fresh-water fish (*De Affect.*, 46). Honey, when eaten with other food, is nutritious, but is injurious when taken alone.

Hippocrates opposed all hypothesis in medicine, and grounded his opinions on disease on actual observation. He insisted that the essence of fever is heat mixed up with noxious qualities. He was the great master of prognostics. His work *Prorrhetica and Coacæ*, says Dr. Francis Adams, "contains a rich treasure of observations which cannot be too much explored by the student of medicine. His prognostics are founded upon the appearance of the face, eyes, tongue, the voice, hearing, the state of the hypochondriac region, the abdomen, the general system, sleep, respiration, and the excretions. We can do little more, in this place, than express our high sense of the value of the *Hippocratic Treatises on Prognostics*, and recommend the study of

them to all members of the profession who would wish to learn the true inductive system of cultivating medicine." (*The Seven Books of Paulus Aegineta*, by Francis Adams.) The state of the countenance which immediately precedes death is called by physicians the *Facies Hippocratica*, because Hippocrates described it, calling it *πρόσωποι διαφθορή* (*Coac. Prænot.*, 212). The nose is sharp, the eyes hollow, the temples sunk, the ears cold and contracted, and their lobes inverted; the skin about the forehead hard, tense, and dry; the countenance pale, greenish, or dark. In fevers he was greatly attached to the importance of the critical days. Galen adopted his list of critical days with little alteration. Hippocrates does not seem to have paid much attention to the pulse, or if he did he attached little importance to it; even in describing epidemical fevers he neglects to mention the characteristics of the pulse. Galen, however, affirms that he was not altogether ignorant of it. He quite correctly described the characteristics of healthy stools, and pointed out that they should in colour be yellowish, if too yellow there is too much bile, if not yellow at all there was a stoppage of the passage of bile to the intestines. His indications from the state of the urine are not less valuable. How wise are his observations on the treatment of febrile diseases! "To be able to tell what had preceded them; to know the present state and foretell the future; to have two objects in view, either to do good or at least do no harm" (*Epidem.*, i. 7). He it was who formulated the rule all physicians have since followed that a fluid diet is proper in all febrile affections. He advised cold sponging in ardent fevers—a method of treatment recently revived and of great value (*De Rat. Vict. Acut.*). He laid it down that diseases in general may be said to arise either from the food we eat or the air we breathe. In cases of fever he allowed his patients to drink freely of barley-water and cold acidulated drinks. In this he was much in advance of the medical science of the time. He has described cases of "brain fever," one of the few complaints which novelists permit their heroes to suffer from. They appear to have been cases of remittent fever rather than true inflammation of the brain. We may estimate the wonderful extent of the medical science of Hippocrates by the fact that he vigorously opposed the popular belief of the period, that epilepsy was due to demoniacal influence. He explains that the lower animals are subject to the same disorder, and that in them it is often associated with water in the brain. There is really no doubt that the *morbus sacer* of the ancients and the cases of demoniacal possession of which we read were cases of epilepsy (*Hippoc. de Morbo Sacro*). Concerning apoplexy he says that a slight attack is difficult to cure, and a severe one utterly incurable. The cause of the attack he considered was turgidity of the

veins. We know it to be often associated with cerebral hæmorrhage or sanguineous apoplexy and sometimes with effusion of serum=serous apoplexy. Hippocrates therefore came very near the truth. He advised bleeding, which is still recommended but is not often practised in England; and he very justly said that the malady occurs most frequently between the age of forty and sixty (*Aphoris.*, ii. 42). In certain forms of ophthalmia he advises free purgation, bleeding, and the use of wine; and this accords with the best modern practice, if for venesection, we substitute vesication. His treatment of nasal polypus by the ligature is not unlike our own; and nothing could be better than his plan for dealing with quinsey and allied complaints, viz., hot fomentations, warm gargles and tinctures, with free purgation. He disapproves of a practice too often followed by surgeons to-day, of scarifying the tonsils when swollen and red. In cases of inflammation of the lungs he advised bleeding, purging, and cooling drinks. Laennec, the great French physician, who invented the stethoscope, highly praises Hippocrates for his knowledge of phthisis, and the diagnostic value of his tests of the nature of the sputa in that disease. In cases of empyema, or the formation and accumulation of pus in the chest, he directs us to make an incision into the pleural cavity—an operation which has been revived in modern times under the name of “paracentesis thoracis.”

He declares the loss of hair and the diarrhœa of phthisis to be fatal signs, and his description of hydrothorax, or dropsy of the chest, has been highly praised by the greatest authorities. He says that phthisis is most common between the ages of eighteen and thirty-six (see *Hippoc. de Morbis*, ii. 45; *Coacæ Prænot., et alibi*). For pleurisy his treatment is practically the same as that followed at the present day. He advised the administration of flour and milk in diarrhœa—an exceedingly useful remedy—and treated the pains of colic by warm injections, warm baths, fomentations, soporifics and purgatives, as the case might require. He was wise enough to know that stone of the bladder was a product of a morbid condition of the urine, and said that when it had fairly formed nothing but an operation for its removal was of any value. He recognised the disease known as hydatids of the liver, and directed that abscesses of that organ should be opened by the cautery. His account of the causes and treatment of dropsy is fairly accurate according to our present knowledge. He approved of paracentesis abdominis (tapping) in cases of ascites, and describes the operation. He recognised the incurability of true cancer. Many of his treatises on the disorders of women prove that they were well understood in his day, and on the whole were properly treated. Difficult labour was managed not so differently from our modern methods as

might be supposed. His account of hip-joint disease is remarkably accurate. Gout was well understood by our author, and probably his treatment by purgation and careful dieting was on the whole as successful as our own.

Hippocrates speaks of leprosy as more a blemish than a disease; it is probable, however, that the works in which he is supposed to allude to it are not genuine. He points out the danger of opening the round tumour on tendons, called a ganglion. In his book called *Prognostics*, he refers to the danger of an erysipelas being translated to an internal part. Cold applications, he says, are useful in this disease when there is no ulceration, but prejudicial when ulceration is present. Struma or scrofula is described by Hippocrates (*De Glandulis*) as being one of the worst diseases of the neck. In the treatise (*De Ulceribus*) on ulcers, he particularly praises wine as a lotion for ulcers, and there is good reason to believe that we might advantageously revert to this treatment. Some of the drugs which he recommends for foul ulcers, such as frankincense and myrrh, are excellent, and owe their efficacy to their "newly discovered" antiseptic action. He recommends also arsenic and verdigris. The actual cautery or burning applied freely to the head is recommended in diseases of the eyes and other complaints. He describes water on the brain in the treatise *De Morbis*, ii. 15, and even recommends perforation of the skull or trephining quite in the modern way. Opening the temporal veins is advised for obstinate headaches. Although no express treatise on bleeding is found amongst the works of Hippocrates, he practised venesection freely in various diseases. He forbids the surgeon to interfere with non-ulcerated cancers, adding that if the cancer be healed the patient soon dies, while if let alone he may live a long time (*Aph.*, vi. 38). He warns us that the sudden evacuation of the matter of empyema or of the water in dropsy proves fatal. He speaks of evacuating the fluid with an instrument similar to that which we call a trochar. He approves of scarification of the ankles in dropsy of the lower extremities; this is quite modern treatment. In cases of dislocation of the hip-joint from the formation of a collection of humours, he recommends burning so as to dry up the redundant humours. He minutely describes the cure of fistula with the ligature in his work *De Fistulis*, which, even if not a genuine treatise of Hippocrates, is extremely ancient, and was considered authentic by Galen. Hæmorrhoids or piles are to be ligatured with very thick thread, or destroyed with red-hot irons. Varicose veins are to be treated by small punctures, not freely opened (*De Ulceribus*, 16). Hippocrates considered the extraction of weapons to be one of the most important departments of surgery. In his treatise *De Medico*,

he says that surgery can only be properly learned by attaching one's self to the army. Homer said,—

“The man of medicine can in worth with many warriors vie,
Who knows the weapons to excise, and soothing salves apply.”

Hippocrates treats of fractures in his books *De Fracturis* (*De Articulis ; De Vulner. Capit. ; Officina Medici*). He insists that no injuries to the head are to be considered as trifling ; even wounds of the scalp may prove dangerous if neglected. Fissures, contusions, and fractures of the cranium are minutely explained and appropriate treatment suggested. He describes the trephine under the name of *τρύπανον*, *i.e.* the trepan. He says that convulsions are the frequent consequence of head injuries, and that they occur on the opposite side of the body to that in which the brain injury is seated. One of the most valuable legacies of the ancients is this profoundly learned treatise of the Father of Medicine, and it proves to us how high a point the surgery of ancient Greece had reached. He noticed a certain movement of the brain during respiration, a swelling up in expiration and a falling down during inspiration ; and although several great authorities of the past denied the accuracy of this observation, it has since been shown to be perfectly correct. (See *Paulus Aegineta*, Dr. F. Adams' edit., vol. ii. p. 442.) In cases of fracture of the lower jaw, our author directs that the teeth separated at the broken part are to be fastened together and bound with gold wire. So accurately does he describe this fracture that Paulus Aegineta transcribes it almost word for word from the *De Articulus*. His method of treating fracture of the clavicle is admirable ; in fracture of the ribs he observes that when the broken ends of the bone are not pushed inwards, it seldom happens that any unpleasant symptoms supervene. In fractures of the arm he minutely and precisely indicates the correct principles on which they are to be treated, and insists strongly on the necessity of having the arm and wrist carefully suspended in a broad soft sling, and that the hand be placed neither too high nor too low. Hippocrates could learn very little from our modern surgeons in the treatment of such injuries. In cases of broken thigh he has indicated all the dangers and difficulties attending the management of this accident ; his splints and bandages are applied much as we apply them at the present time, and his suggestions for ensuring a well-united bone without deformity of the limb are invaluable. In fractures of the thigh and leg-bones he lays great stress on the attention necessary to the state of the heel. In those of the foot he warns against the danger of attempting to walk too soon. In compound fractures compresses of wine and oil are to be used, and splints are not to be applied till the wound puts on a

healthy appearance. He is fully aware of the peculiarly dangerous character of such injuries, and his observations read like extracts from a modern text-book of surgery. "No author," says Dr. Francis Adams, the learned translator of the works of Paulus Ægineta, "has given so complete a view of the accidents to which the elbow joint is subject as Hippocrates."

PLATO (B.C. 427-347) in its philosophical aspect studied medicine, not with any idea of practising the art, but merely as a speculative contemplation. The human soul is an emanation from the absolute intelligence. The world is composed of the four elements. Fire consists of pyramidal, earth of cubical, air of octagonal, and water of twenty-sided atoms. Besides these is the æther. Everything in the body has in view the spirit. The heart is the seat of the mind, the lungs cool the heart, the liver serves the lower desires and is useful for divination. The spleen is the abode for the impurities of the blood. The intestines serve to detain the food, so that it might not be necessary to be constantly taking nourishment. The inward pressure of the air accounts for the breathing. The muscles and bones protect the marrow against heat and cold. The marrow consists of triangles, and the brain is the most perfect form of marrow. When the soul is separated from the marrow, death occurs. Sight is caused by the union of the light which flows into and out of the eyes, hearing in the shock of air communicated to the brain and the blood. Taste is due to a solution of sapid atoms by means of small vessels, which vessels conduct the dissolved atoms to the heart and soul. Smell is very transitory, not being founded on any external image. The uterus is a wild beast exciting inordinate desires. Disease is caused by a disturbance of the quantity and quality of the fluids. Inflammations are due to aberrations of the bile. The various fevers are due to the influence of the elements. Mental diseases are the results of bodily maladies and bad education. Diseases fly away before appropriate drugs. Physicians must be the rulers of the sick in order to cure them, but they must not be money-makers.¹

In the *Republic of Plato*, Book III., we find that medical aid was largely in request in Greece to relieve the indolent and voluptuous from the consequences of self-indulgence. It was thought by Socrates disgraceful to compel the clever sons of Asclepius to attend to such diseases as flatulence and catarrh; it seemed ridiculous to the philosopher to pay so much attention to regimen and diet as to drag on a miserable existence as an invalid in the doctor's hands. When a carpenter was ill, he expected his doctor to cure him with an emetic or a purge, the cautery or an operation; if he were ordered a long course of diet, he

¹ Baas, *Hist. Med.*, Eng. Trans., pp. 111, 112.

would tell his doctor that he had no time to be ill, and he would go about his business regardless of consequences. *Æsculapius*, it was maintained, revealed the healing art for the benefit of those whose constitutions were naturally sound ; he expelled their disorders by drugs and the use of the knife, without interfering with their usual avocations ; but when he found they were hopelessly incurable, he would not attempt to prolong a miserable life by rules and diet, as such persons would be of no use either to themselves or the state. Constitutionally diseased persons and the intemperate livers were to be left to be dealt with by Nature, so that they might die of their diseases.

CHAPTER III.

POST-HIPPOCRATIC GREEK MEDICINE.—THE SCHOOLS OF MEDICINE.

The Dogmatic School.—Praxagoras of Cos.—Aristotle.—The School of Alexandria.—Theophrastus the Botanist.—The great Anatomists, Erasistratus and Hierophilus, and the Schools they founded.—The Empiric School.

THE DOGMATIC SCHOOL.

It was only natural that the philosophical Greeks should discuss medicine at as great a length as they discussed philosophy; accordingly, we find that no sooner had our art taken its place amongst the subjects worthy of being seriously considered by the Greek intellect, than it was as much talked about as practised, and wrangled over as though it were a system of religion. Sects arose which opposed each other with the greatest vehemence; and Hippocrates had not long formulated his teaching when his disciples elevated his principles into a dogmatism which challenged, and shortly provoked, opposition of various kinds. Then arose the schools of medicine which ultimately became famous, as those of the DOGMATISTS, EMPIRICS, METHODISTS, PNEUMATISTS, etc. The DOGMATISTS boasted of being the Rational and Logical school. They held that there is a certain connection between all the arts and sciences, and that it is the duty of the physician to avail himself of all sorts of knowledge on every subject which bears any relationship to his own. They made, therefore, the most careful inquiry into the remote and proximate causes of disease. They examined the influence on the human body of airs, waters, places, occupations, diet, seasons, etc. They formulated general rules, not of universal application, but modified their treatment according to circumstances, availing themselves of whatever aid they could obtain from any source. Hippocrates had said, "The physician who is also a philosopher is equal to the gods," and the Dogmatists elevated this into an article of their creed. Hippocrates, Galen, Oribasius, Ætius, Paulus Ægineta, and the Arab physicians were dogmatists. The founders of the school were the sons of Hippocrates—Thessalus and Draco. The former was the eldest son of the great physician, and was the more famous of the two. He passed a

great part of his life as physician in the court of Archelaus, king of Macedonia.¹ His brother, Draco, was physician to Queen Roxana, wife of Alexander the Great.

We may say, therefore, that the oldest, most famous, and worthy of the ancient medical sects arose about 400 B.C., and retained its power over the medical profession till the rise of the Empirical sect in the Alexandrian school of philosophy. We are indebted to Celsus for a lucid and admirable exposition of the doctrines professed by these two medical parties.²

The Dogmatists maintained that it was not enough for the physician to know the mere symptoms of his patient's malady. It does not suffice to know the *evident causes* of the disorder, but he must acquaint himself with the *hidden causes*. To acquire this knowledge of the *hidden causes*, he must study the *hidden parts*, and the natural actions and functions of the body in health. He must know the principles on which the human machinery is constructed before he can scientifically treat the accidents and disturbances to which it is liable. It was not, therefore, a mere subject of philosophical interest to hold with some physicians that diseases proceed from excess or deficiency of one or other of the four elements, or with others, that the various humours or the respiration were at fault. It was not of merely academic interest to suppose that the abnormal flow of the blood caused inflammations, or that corpuscles blocked up the invisible passages. The doctor must do more than speculate on these things in his discussions. He must have a theory upon them which he could apply to the treatment of his patients, and the best physician would be the one who best knew how the disease originated. Experiments without reasoning were valueless; their chief use was to inform the experimenter whether he had reasoned justly or conjectured fortunately. When the physician is confronted by a new form of disease for which no remedy has been discovered, he must know its cause and origin, or his practice will be mere guess-work. Anybody can discover the evident causes—heat, cold, over-eating. These things the least instructed physician will probably know. It is the knowledge of hidden causes which makes the superior man. He who aspires to be instructed must know what we now call physiology—why we breathe, why we eat, what happens to the food which we swallow, why the arteries pulsate, why we sleep, etc. The man who cannot explain these phenomena is not a competent doctor. He must have frequently inspected dead bodies, and examined carefully their internal parts; but they maintained that it was much the better way to

¹ Le Clerc, *Hist. de la M^d*, Pt. I., bk. iv.

² Celsus, *De Medic.*, Præfat., in lib. i.

open living persons, as Herophilus and Erasistratus did, so that they could acquaint themselves in life with the structures whose disturbance or disease causes the sufferings which they were called upon to alleviate. What is known as the "Humoral Pathology" formed the most essential part of the system of the Dogmatists.

Humoral pathology explains all diseases as caused by the mixture of the four cardinal humours; viz., the blood, bile, mucus or phlegm, and water. Hippocrates leaned towards it, but it was Plato who developed it. The stomach is the common source of all these humours. When diseases develop, they attract these humours. The source of the bile is the liver; of the mucus, the head; of the water, the spleen. Bile causes all acute diseases, mucus in the head causes catarrhs and rheumatism, dropsy depends on the spleen.

DIOCLES CARYSTIUS, a famous Greek physician, said by Pliny¹ to have been next in age and fame to Hippocrates himself, lived in the fourth century B.C. He wrote several treatises on medicine, of which the titles and some fragments are preserved by Galen, Cælius Aurelianus, Oribasius, and others. His letter to King Antigonos, entitled "An Epistle on Preserving Health," is inserted at the end of the first book of Paulus Ægineta, and was probably addressed to Antigonos Gonatus, king of Macedonia, who died B.C. 239. This treatise is so valuable a summary of the medical teaching of the time that it will be useful to insert it in this place. "Since of all kings you are the most skilled in the arts, and have lived very long, and are skilled in all philosophy, and have attained the highest rank in mathematics, I, supposing that the science which treats of all things that relate to health is a branch of philosophy becoming a king and befitting to you, have written you this account of the origin of diseases, of the symptoms which precede them, and of the modes by which they may be alleviated. For neither does a storm gather in the heavens but it is preceded by certain signs which seamen and men of much skill attend to, nor does any disease attack the human frame without having some precursory symptom. If, then, you will only be persuaded by what we say regarding them, you may attain a correct acquaintance with these things. We divide the human body into four parts: the head, the chest, the belly, and the bladder. When a disease is about to fix in the head, it is usually announced beforehand by vertigo, pain in the head, heaviness in the eyebrows, noise in the ears, and throbbing of the temples; the eyes water in the morning, attended with dimness of sight; the sense of smell is lost, and the gums become swelled. When any such symptoms occur, the head ought to be purged, not indeed with any strong medicine, but, taking

¹ *Hist. Nat.*, xxvi. 6.

the tops of hyssop and sweet marjoram, pound them and boil them in a pot, with half a hemina of must or rob ; rinse the mouth with this in the morning before eating, and evacuate the humours by gargling. There is no gentler remedy than this for affections of the head. Mustard in warm, honied water also answers the purpose very well. Take a mouthful of this in the morning before eating, gargle and evacuate the humours. The head also should be warmed by covering it in such a manner as that the phlegm may be readily discharged. Those who neglect these symptoms are apt to be seized with the following disorders : inflammations of the eyes, cataracts, pain of the ears as if from a fracture, strumous affections of the neck, sphacelus of the brain, catarrh, quinsy, running ulcers called achores, caries, enlargement of the uvula, defluxion of the hairs, ulceration of the head, pain in the teeth. When some disease is about to fall upon the chest, it is usually announced by some of the following symptoms : There are profuse sweats over the whole body, and particularly about the chest, the tongue is rough, expectoration saltish, bitter, or bilious, pains suddenly seizing the sides or shoulder-blades, frequent yawning, watchfulness, oppressed respiration, thirst after sleep, despondency of mind, coldness of the breast and arms, trembling of the hands. These symptoms may be relieved in the following manner : Procure vomiting after a moderate meal without medicine. Vomiting also when the stomach is empty will answer well ; to produce which first swallow some small radishes, cresses, rocket, mustard and purslain, and then by drinking warm water procure vomiting. Upon those who neglect these symptoms the following diseases are apt to supervene : pleurisy, peripneumony, melancholy, acute fevers, frenzy, lethargy, ardent fever attended with hiccough. When any disease is about to attack the bowels, some of the following symptoms announce its approach : In the first place, the belly is griped and disordered, the food and drink seem bitter, heaviness of the knees, inability to bend the loins, pains over the whole body unexpectedly occurring, numbness of the legs, slight fever. When any of these occur, it will be proper to loosen the belly by a suitable diet without medicine. There are many articles of this description which one may use with safety, such as beets boiled in honeyed water, boiled garlic, mallows, dock, the herb mercury, honied cakes ; for all these things are laxative of the bowels. Or, if any of these symptoms increase, mix bastard saffron with all these decoctions, for thereby they will be rendered sweeter and less dangerous. The smooth cabbage boiled in a large quantity of water is also beneficial. This decoction, with honey and salt, may be drunk to the amount of about four heminæ, or the water of chick-peas and tares boiled may be drunk in

the same manner. Those who neglect the afore-mentioned symptoms are apt to be seized with the following affections : diarrhœa, dysentery, lientery, ileus, ischiatic disease, tertian fever, gout, apoplexy, hæmorrhoids, rheumatism. When any disease is about to seize the bladder, the following symptoms are its usual precursors : A sense of repletion after taking even a small quantity of food, flatulence, eructation, paleness of the whole body, deep sleep, urine pale and passed with difficulty, swellings about the privy parts. When any of these symptoms appear, their safest cure will be by aromatic diuretics. Thus, the roots of fennel and parsley may be infused in white fragrant wine, and drunk every day when the stomach is empty in the morning, to the amount of two cyathi, with water in which carrot, myrtle, or elecampane has been macerated (you may use any of these you please, for all are useful) ; and the infusion of chick-peas in water in like manner. On those who neglect these symptoms the following diseases are apt to supervene : dropsy, enlargement of the spleen, pain of the liver, calculus, inflammation of the kidney, strangury, distension of the belly. Regarding all these symptoms, it may be remarked that children ought to be treated with gentler remedies, and adults with more active. I have now to give you an account of the seasons of the year in which each of these complaints occur, and what things ought to be taken and avoided. I begin with the winter solstice. *Of the winter solstice* : This season disposes men to catarrhs and defluxions until the vernal equinox. It will be proper then to take such things as are of a heating nature, drink wine little diluted, or drink pure wine, or of the decoction of marjoram. From the winter solstice to the vernal equinox are ninety days. *Of the vernal equinox* : This season increases phlegm in men, and the sweetish humours in the blood, until the rising of the pleiades. Use therefore juicy and acrid things, take labour, . . . To the rising of the pleiades are forty-six days. *Of the rising of the pleiades* : This season increases the bitter bile and bitter humours in men, until the summer solstice. Use therefore all sweet things, laxatives of the belly. . . . To the summer solstice are forty-five days. *Of the summer solstice* : This season increases the formation of black bile in men, until the autumnal equinox. Use therefore cold water, and everything that is fragrant. . . . To the autumnal equinox are ninety-three days. *Of the autumnal equinox* : This season increases phlegm and thin rheums in men until the setting of the pleiades. Use therefore remedies for removing rheums, have recourse to acrid and succulent things, take no vomits, and abstain from labour. . . . To the setting of the pleiades are forty-five days. *Of the setting of the pleiades* : This season increases phlegm in men until the winter solstice. Take therefore all

sour things, drink as much as is agreeable of a weak wine, use fat things, and labour strenuously. To the winter solstice are forty-five days.”¹

PRAXAGORAS of Cos, who lived in the fourth century B.C., shortly after Diocles, was a famous physician of the Dogmatic sect, who especially excelled in anatomy and physiology. He placed the seat of all diseases in the humours of the body, and was one of the chief supporters of what is known as the “humoral pathology.” Sprengel² and others state that he was the first who pointed out the distinction between the arteries and the veins; but M. Littré denies this, and seems to prove that the differences were known to Aristotle, Hippocrates, and other writers.³ His knowledge of anatomy must have been very considerable, and his surgery was certainly bold; so that he even ventured, in cases of intussusception of the bowel, to open the abdomen in order to replace the intestine. In hernia he practised the taxis,⁴ i.e. replaced the bowel by the hand; and he amputated the uvula in affections of that organ. He had many pupils, amongst others Herophilus, Philotimus, and Plis-tonicus.

ARISTOTLE, the founder of comparative anatomy and the father of the science of natural history, was the son of Nichomachus, physician to Amyntas II., king of Macedonia. He was born at Stageira, B.C. 334. His father was a scientific man of the race of the Asclepiads, and it was the taste for such pursuits and the inherited bent of mind which early inclined the son to the investigation of nature. He went to Athens, where he became the disciple of Plato, and remained in his society for twenty years. In his forty-second year he was summoned by Philip of Macedon to undertake the tuition of Alexander the Great, who was then fifteen years old. Of his philosophical works it is not here necessary to speak; it is his scientific labours, which had so important an influence on medical education, which chiefly concern us. He wrote *Researches about Animals, On Sleep and Waking, On Longevity and Shortlivedness, On Respiration, On Parts of Animals, On Locomotion of Animals, On Generation of Animals*. Aristotle inspired Alexander with a passion for the study of natural history, and his royal pupil gave him abundant means and opportunity to collect materials for a history of animals. The science of comparative anatomy, so important in relation to that of medicine, was thus established. He

¹ On the question of the authenticity of this epistle see Dr. Adams' commentary in his *Paulus Aegineta*, vol. i. p. 186.

² *Hist. de la Méd.*, vol. i. pp. 422-3.

³ *Œuvres d'Hippocr.*, vol. i. p. 202, etc.

⁴ Cæl. Aurel., *De Morb. Acut.*, iii. 17.

pointed out the differences which exist between the structure of men and monkeys; described the organs of the elephant, and the stomach of the ruminant animals. The anatomy of birds and the development of their eggs during incubation were accurately described by him; he dissected reptiles, and studied the habits of fishes. He investigated the action of the muscles, regarded the heart as the origin of the blood-vessels, named the *aorta* and the *ventricles*, described the nerves which he thought originated in the heart, but he confused the nerves with the ligaments and tendons. The heart he considered as the centre of movement and feeling¹ and nourishment, holding that it contains the natural fire, and is the birthplace of the passions and the seat of the soul; the brain he thought was merely a mass of water and earth, and did not recognise it as nervous matter. The diaphragm he considered had no other office than to separate the abdomen from the thorax and protect the seat of the soul (the heart) from the impure influences of the digestive organs. Superfoetation (or the conception of a second embryo during the gestation of the first) he held to be possible, and he first pointed out the *punctum saliens*.

THEOPHRASTUS, whose real name was Tyrtamus, was born at Eresia in the island of Lesbos, 371 B.C., fourteen years after Aristotle. He was the originator of the science of plants; he first learned the details of their structure, the uses of their organs, the laws of their reproduction,—in a word, the physiology of the vegetable world. When Aristotle retired to Chalcis, he chose Theophrastus, to whom he gave that name, signifying “a man of divine speech,” as his successor at the Lyceum. This distinguished philosopher devoted himself alike to the exact and speculative sciences. The greater part of his works have perished; what is preserved to us consists of treatises on the history of the vegetable kingdom, of stones, and some fragments of works on physics, medicine, and some moral works. His *History of Plants* enumerates about five hundred different kinds, many of which are now difficult to identify. He made some attempts at a vague kind of classification, and has chapters on aquatic, kitchen, parasite, succulent, oleaginous, and cereal plants. He carefully explains the principles of the reproduction of vegetables, and the fecundation of the female flowers by the pollen of the male. He recognises hermaphrodite and unisexual flowers, and points out how the fecundation of the latter is effected by the wind, insects, and by the water in the case of aquatic plants. He knew that double flowers were sterile. He devotes a chapter to the diseases of the vegetable kingdom; he almost recognised the characteristics which distinguish the monocotyledonous from the dicotyledonous plants. In a

¹ Le Clerc, *Hist. de la Méd.* Meryon, *Hist. Méd.*, p. 35.

word, he laid the foundations on which our modern botanists have erected their science.¹

THE SCHOOL OF ALEXANDRIA.

"In the year 331 B.C.," says Kingsley,² "one of the greatest intellects whose influence the world has ever felt, saw, with his eagle glance, the unrivalled advantages of the spot which is now Alexandria; and conceived the mighty project of making it the point of union of two, or rather of three worlds. In a new city, named after himself, Europe, Asia, and Africa were to meet and to hold communion." When Greece lost her intellectual supremacy with her national independence, the centre of literature, philosophy, and science was shifted to this unique position. With all the treasures of Egyptian wisdom around her, with all the stores of Eastern thought on the one hand and those of Europe on the other, Alexandria became in her schools the rallying-point of the world's thought and activity. If we turn to an atlas of ancient geography, we shall be struck with the unrivalled facilities possessed by this city for gathering to itself the treasures, intellectual and material, of the conquered world of Alexander the Great. From the Danube, Greece, Phœnicia, Palestine, Persia, Asia Minor, India, Italy, and the Celtic tribes, there came embassies to Egypt to seek the protection and alliance of Alexander of Macedon, and each must have contributed something to the greatness of the city which he had founded. Just as every traveller in after years who passed through the place was compelled to leave a copy of any work which he had brought with him, to the Alexandrian library, so from the first foundation of the town was every visitor a donor of some idea to its stores of thought.

At the dismemberment of Alexander's vast empire, after his death, the Egyptian portion fell to the share of Ptolemy Soter. It was this sovereign who founded the famous Alexandrian Library; a great patron of the arts and sciences, he placed this institution under the direction of Aristotle. He also established the Schools of Alexandria, and encouraged the dissection of the human body.

CHRYSIPPUS, the Cnidian, who lived in the fourth century B.C., was the father of the Chrysippus who was physician to Ptolemy Soter, and he was tutor to Erasistratus. Pliny says that he reversed the practice of preceding physicians in the most extraordinary manner. He would not permit bleeding, because the blood contains the soul; did not prac-

¹ *Études Biographiques* par Paul-Antoine, Cap. p. 26. The *Treatise on Stones* by Theophrastus is one of the first works we possess on the study of minerals.

² *Alexandria and her Schools*, p. 6.

tise purging, though he sometimes permitted the use of enemata and emetics. He wrote on herbs and their uses, and drove the blood out of limbs previous to their amputation on the principles recently re-introduced by Esmarch. He introduced the use of vapour baths in the treatment of dropsy. As there were several physicians of the name of Chrysippus, and as their works are lost, it is very difficult to distinguish their maxims. Amongst the disciples of the Cnidian physician of this name were MEDIUS, ARISTOGENES, METRODORUS, and ERASISTRATUS, as we have said.

HEROPHILUS, of Chalcedon in Bithynia, a pupil of CHRYSIPPUS of Cnidos and PRAXAGORAS of Cos, was one of the most famous physicians of the ancient world. He was a great anatomist and physiologist, and a contemporary of the philosopher Diodorus Cronos, and of Ptolemy Soter in the fourth and third centuries B.C. He settled at Alexandria, which under Ptolemy I. became the most famous centre of the science of the ancient Greeks. Here Herophilus founded with other physicians of the city the great medical school which ultimately became distinguished above all others, so that a sufficient guarantee of a physician's ability was the fact that he had received his education at Alexandria. The foundation of the Alexandrian School formed a great epoch in the history of medicine. The dissection of the human body was of the utmost importance to the healing art. While the practice was forbidden, it could only have been performed furtively and in a hasty and unsatisfactory manner. The science of anatomy, on which that of medicine to be anything but quackery must be founded, now took its proper place in the education of the doctor. The bodies of all malefactors were given over for the purposes of dissection.¹ Herophilus is accused of having also dissected alive as many as six hundred criminals. This fact has been denied by some of his biographers, and others have attempted to explain it away; but it is charged against him by Tertullian,² and Celsus mentions it³ as though it were a well-known fact, and without the least suspicion that it was an unjust accusation.

Asked who is the best doctor, he is said to have replied, "He who knows how to distinguish the possible from the impossible."

In the course of his anatomical researches he made many discoveries and gave to parts of the human body names which remain in common use to this day. Dr. Baas thus sums up his anatomical and physiological knowledge. He knew the nerves, that they had a capacity for sensation, and were subject to the will, were derived from the brain, in which he discovered the calamus scriptorius, the tela choroidea, the

¹ Galen, *De Uteri Dissect.*, c. 5, vol. ii. p. 895.

² *De Anima*, c. 10, p. 757.

³ *De Medic.*, i. Præf., p. 6.

venous sinuses, and torcular Herophili. He believed the fourth ventricle to be the seat of the soul. He discovered the chyliiferous and lactiferous vessels. He described accurately the liver and Fallopiian tubes, the epididymis and the duodenum, to which he gave its name, and also the os hyoides, the uvea, the vitreous humour, the retina, and the ciliary processes. He called the pulmonary artery the *vena arteriosa*, and the pulmonary vein the *arteria venosa*. He distinguished in respiration a systole, a diastole, and a period of rest. He founded the doctrine of the pulse, its rhythm, the bounding pulse and its varieties according to age. The pulse is communicated by the heart to the walls of the arteries. He distinguished between arteries and veins, and admitted that the arteries contain blood. He taught that diseases are caused by a corruption of the humours. Paralysis is due to a lack of nerve influence. He laid great stress upon diet, bled frequently, and practised ligation of the limbs to arrest bleeding. He was the first to administer cooking salt as a medicine. A good botanist, he preferred vegetable remedies, which he termed the "Hands of the gods." He possessed considerable acquaintance with obstetric operations,¹ and wrote a text-book of midwifery.²

ERASISTRATUS, of Iulis in the island of Cos, a pupil of CHRYSIPPUS was one of the most famous physicians and anatomists of the Alexandrian school. Plutarch says that when he was physician to King Seleucus, he discovered that the young prince Antiochus had fallen in love with his step-mother Stratonice by finding no physical cause for the illness from which he was suffering, and that his heart palpitated, he trembled, blushed, and perspired when the lady entered the room. By adroit management he induced the king to confer on the prince the object of the young man's passion. *Similia similibus curantur*. So successful was the treatment that the physician received a fee of 100 talents, which supposing the Attic standard to be meant would amount to £24,375, perhaps the largest medical fee on record.³ He lived for some time in Alexandria, and gave up medical practice in his old age, that he might devote his whole time to the study of anatomy.

Dr. Baas, in his account of the Anatomy, Physiology, and Medicine of Erasistratus, says that he divided the nerves into those of sensation and those of motion. The brain substance is the origin of the motor and the brain membranes that of the sensory nerves.⁴ Like Herophilus,

¹ Baas, *Hist. of Med.*, pp. 121-123.

² Puschmann, *Hist. Med. Educ.*, p. 76.

³ Plutarch's *Life of Demetrius*.

⁴ He modified his opinions on the nerves by careful dissections, and greatly improved his physiology.

he confounded the nerves and ligaments. He described accurately the structure, convolutions, and ventricles of the brain. He thought that the convolutions, especially those of the cerebellum, are the seat of thought, and located mental diseases in the brain. He knew the lymph and chyle vessels, and the chordæ tendineæ of the heart. He assumed the anastomoses of the arteries and veins. The pneuma in the heart is vital spirits, in the brain is animal spirits. Digestion is due to the friction of the walls of the stomach. He thought that the bile is useless, as is the spleen and other viscera. He shows some acquaintance with pathological anatomy, as he describes induration of the liver in dropsy. His idea of the cause of disease is plethora and aberration of the humours. Inflammation is due to the detention of the blood in the small vessels by the pneuma driven from the heart into the arteries; fever occurs when the pneuma is crowded back to the heart by the venous blood, and blood gets into the large arteries. Dropsy always proceeds from the liver. He discarded bleeding and purgation; recommended baths, enemata, emetics, friction, and cupping. He was, thinks Dr. Baas, a forerunner of Hahnemann in the doctrine of small doses, as he prescribed three drops of wine in bilious diarrhoea. He opened the abdomen to apply remedies directly to the affected part, and invented a kind of catheter.¹

Erasistratus was the first to describe a species of hunger, to which he gave the name *Boulimia*—a desire for food which cannot be satisfied. In his account of the complaint he mentions the Scythians, who, when obliged to fast, tie bandages round their abdomens tightly, and this stays their hunger.²

The ancient apologists for the human vivisections of Herophilus and Erasistratus used to say that these anatomists were thus “enabled to behold, during life, those parts which nature had concealed, and to contemplate their situation, colour, figure, size, order, hardness or softness, roughness or smoothness, etc. They added that it is not possible, when a person has any internal illness, to know what is the cause of it, unless one is exactly acquainted with the situation of all the viscera; nor can one heal any part without understanding its nature: that when the intestines protrude through a wound, a person who does not know what is their colour when in a healthy state cannot distinguish the sound from the diseased parts, nor therefore apply proper remedies; while, on the contrary, he who is acquainted with the natural state of the diseased parts will undertake the cure with confidence and certainty; and that, in short, it is not to be called an act of cruelty, as some persons suppose

¹ Baas, *Hist. of Med.*, pp. 121–123.

² Le Clerc, *Hist. de la Méd.*, Pt. II. c. iii.

it, to seek for the remedies of an immense number of *innocent* persons in the sufferings of a few *criminals*.”¹

AMMONIUS OF ALEXANDRIA, surnamed LITHOTOMUS, probably lived in the reign of Ptolemy Philadelphus (B.C. 283–247). He is celebrated as having been the first surgeon who thought of crushing a stone within the bladder when too large for extraction entire; for this reason he was called λιθοτόμος. Celsus describes his method.²

Of the Herophilists we may mention DEMETRIUS OF APAMÆA (B.C. 276), who named and described diabetes, and was distinguished as an obstetrician.

MANTIAS, who, B.C. 250, first collected the preparations of medicines into a special book.

DEMOSTHENES PHILAETHES, who, under Nero, was the most celebrated oculist of his time, wrote a work on diseases of the eye, which was the standard authority until about A.D. 1000. The work has perished, but Ætius and Paulus Ægineta have preserved some fragments of it. He wrote also on the pulse.

HEGETON was a surgeon of Alexandria who was mentioned by Galen as having lived there as a contemporary of several physicians who were known to have resided in that city at the end of the second or the beginning of the first century B.C. He was a follower of Herophilus, and wrote a book on the causes of diseases entitled Περὶ Αἰτιῶν, which has perished.

Of the school of Erasistratus we may mention XENOPHON OF COS, who wrote a work on the names of the parts of the human body, and on botany and the diseases of women. NICIAS OF MILETUS, a friend of the poet Theocritus; PHILOXENOS, who, according to Celsus, wrote several valuable books on surgery; and MARTIALIS the Anatomist, who visited Rome about A.D. 165. He knew Galen, and wrote works on anatomy which were in great repute long after his death.

The followers of Herophilus and Erasistratus, though they founded schools, did not greatly influence the art of medicine, nor did they contribute much to its advancement beyond the point in which it was left by their great masters. They fell into fruitless speculations instead of pursuing their science by accumulating facts; in the words of Pliny, it was easier “to sit and listen quietly in the schools, than to be up and

¹ Dr. W. A. Greenhill, art. “Dogmatici,” Smith’s *Dict. Class. Ant.* Briefly, this was as much as to say that a man could not be an educated doctor who had not practised, or at least seen, human vivisection. As these have not been performed since the fifteenth century, when, as we shall learn, they were practised by Italian anatomists, it follows, according to the argument, that the Alexandrian physicians were better educated than our own!

² *De Med.*, vii. 26. See also Smith’s *Dict. Ant.*, p. 220.

wandering over deserts, and to seek out new plants every day.”¹ So Dogmatism fell into disrepute and made way for the advent of Empiricism.

SCHOOL OF THE EMPIRICS.

The School of the Empirics was the outcome of the system of Scepticism, introduced by Pyrrho and extended by Carneades, who taught that there is no certainty about anything, no true knowledge of phenomena, and that probability alone can be our guide. Ænesidemus carried this scepticism into the medicine of the Empirics, but the school was originally established under the title of the Teretics or Mnemonics. The Empirics rested their system on what was called the “Empiric tripod,”—that is, accident, history, and analogy. Remedies have come to us by chance, by the remembrance of previous cures, and by applying them to similar cases.

The sect of the EMPIRICISTS was founded by Serapion of Alexandria and Philinus of Cos in the third century B.C. They were in opposition to the Dogmatists, professing to derive their knowledge only from experience; they held that the whole art of medicine consisted in observation, experiment, and the application of known remedies which have constantly proved valuable in the treatment of one class of diseases to other and presumably similar classes. Celsus,² in his account of the principles of this sect, says that “they admit that the evident causes are necessary, but deprecate inquiry into them because nature is incomprehensible. This is proved because the philosophers and physicians who have spent so much labour in trying to search out these occult causes cannot agree amongst themselves. If reasoning could make physicians, the philosophers should be the most successful practitioners, as they have such abundance of words. If the causes of diseases were the same in all places, the same remedies ought to be used everywhere. Relief from sickness is to be sought from things certain and tried, that is from experience, which guides us in all other arts. Husbandmen and pilots do not reason about their business, but they practise it. Disquisitions can have no connection with medicine, because physicians whose opinions have been directly opposed to one another have equally restored their patients to health; they did not derive their methods of cure from studying the occult causes about which they disputed, but from the experience they had of the remedies which they employed upon their patients. Medicine was not first discovered in consequence of reasoning, but the theory was sought for after the discovery of medicine. Does reason, they ask, prescribe

¹ Plin., *Hist. Nat.*, xxvi. 6.

² *De Med.*, Præfat.

the same as experience, or something different? If the same, it must be needless; if different, it must be mischievous.

“But what remains is also cruel, to cut open the abdomen and præcordia of living men, and make that art, which presides over the health of mankind, the instrument, not only of inflicting death, but of doing it in the most horrid manner; especially if it be considered that some of those things which are sought after with so much barbarity cannot be known at all, and others may be known without any cruelty: for that the colour, smoothness, softness, hardness, and such like, are not the same in a wounded body as they were in a sound one; and further, because these qualities, even in bodies that have suffered no external violence, are often changed by fear, grief, hunger, indigestion, fatigue, and a thousand other inconsiderable disorders, which makes it much more probable that the internal parts, which are far more tender, and never exposed to the light itself, are changed by the severest wounds and mangling. And that nothing can be more ridiculous than to imagine anything to be the same in a dying man, nay, one already dead, as it is in a living person; for that the abdomen may indeed be opened while a man breathes, but as soon as the knife has reached the præcordia, and the transverse septum is cut, which by a kind of membrane divides the upper from the lower parts (and by the Greeks is called the diaphragm), the man immediately expires; and then the præcordia, and all the viscera, never come to the view of the butchering physician till the man is dead; and they must necessarily appear as such of a dead person, and not as they were while he lived; and thus the physician gains only the opportunity of murdering a man cruelly, and not of observing what are the appearances of the viscera in a living person. If, however, there can be anything which can be observed in a person which yet breathes, chance often throws it in the way of such as practise the healing art; for that sometimes a gladiator on the stage, a soldier in the field, or a traveller beset by robbers, is so wounded that some internal part, different in different people, may be exposed to view; and thus a prudent physician finds their situation, position, order, figure, and the other particulars he wants to know, not by perpetrating murder, but by attempting to give health; and learns by compassion that which others had discovered by horrid cruelty. That for these reasons it is not necessary to lacerate even dead bodies; which, though not cruel, yet may be shocking to the sight; since most things are different in dead bodies; and even the dressing of wounds shows all that can be discovered in the living” (Futvoye’s Translation).¹

PHILINUS OF COS, the reputed founder of the school, was a pupil of

¹ Celsus, *Of Medicine*.

Herophilus, and lived in the third century B.C. He declared that all the anatomy his vivisection master had taught him had not helped him in the least in the cure of his patients. He has been compared with Hahnemann.

SERAPION OF ALEXANDRIA was also of the third century B.C. He must not be confounded with the Arabian physician of this name. He wrote against Hippocrates. He discarded all hypotheses. He was the first to prescribe sulphur in chronic skin diseases; and he used some singular and disgusting remedies in his treatment. One of these was crocodiles' dung, which in consequence became scarce and costly. GLAUCIAS, who invented the "Empiric Tripod," ZEUXIS and HERACLIDES of Tarentum, lived about this period. The latter wrote commentaries on Hippocrates, and used opium to procure sleep. He mentions strangulated hernia in one of his treatises.

Many commentaries were written about this time on Hippocrates; and the art of pharmacy, especially the preparation of poisons, was much studied in the second century B.C. Botanic gardens were established, and men began to experiment with antidotes for poisons. "Mithridaticum," so called after MITHRIDATES THE GREAT OF PONTUS, was a famous antidote which was used even to recent times. NICANDER OF COLOPHON wrote poems on poisons, and antidotes, leeches, and emetics for the first time appeared in poetry, and the symptoms of opium and lead-poisoning were not beneath the attention of the muse. ATTALUS III., king of Pergamos, was in constant fear of being poisoned, says Plutarch,¹ amused himself with planting poisonous herbs, not only henbane and hellebore, but hemlock, aconite, and dorycnium. He cultivated these in the royal gardens, gathered them at the proper seasons, and studied their properties and the qualities of their juices and fruits.

Cleopatra is said by Baas² to have written a work on the diseases of parturient and lying-in women, etc. She paid special attention, it would seem, to maladies of a specific character.

Le Clerc gives a list of the women who have exercised the profession of medicine in ancient times.³

CLEOPATRA treated the diseases of women. ARTEMISIA, Queen of Caria, ISIS, CYBELE, LATONA, DIANA, PALLAS, ANGITA, MEDEA, CIRCE, POLYDAMNA, AGAMEDA, HELEN, CENONE, HIPPO, OCRYOE, EPIONE, ERIOPIS, HYGEIA, ÆGLE, PANACEA, JASO, ROME, and ACESO are the ladies of classic story who had more or less acquaintance with medicine for good or evil purposes. That women, subject to many

¹ *Life of Demetrius.*

² *Hist. Med.*, p. 129.

³ *Hist. de la Méd.*; Pt. II., bk. iii., ch. xiii.

disorders for which in any state of society their natural modesty would make it difficult for them to consult men, should become proficient in the treatment of complaints which are peculiar to their sex, is the most natural thing in the world, and it is probable that very much of our knowledge of the treatment of these cases may be due to feminine wisdom. An ancient law of the Athenians forbade women and slaves to exercise the art of medicine, so that even midwifery, which they considered a branch of it, could only be practised by men. Some Athenian ladies preferred to die rather than be attended by men in their confinements. Women acted as accoucheuses in Egypt, Greece, and Rome, and some of them in classic times wrote books on medicine. Ætius gives some fragments in his works from a doctress named ASPASIA.

Although the Greek physicians did not know anything of the circulation of the blood as we understand it, they were not wholly ignorant of the phenomena of the vascular system.

The arteries were so called by the ancients because they thought they contained air, as they were always found empty after death. Hippocrates and his contemporaries called the trachea an artery. Some of the ancient anatomists, however, knew that they contain blood, and they knew that when an artery is divided it is more dangerous and entails a longer recovery than the division of a vein. They knew also of the pulsation in the arteries which does not exist in the veins, and they were fully aware of the importance of this fact in its relation to diagnosis and treatment.

"The ancients chiefly regarded the odd days, and called them critical (*κρίσιμοι*), as if on these a judgment was to be formed concerning the patient. These days were the third, fifth, seventh, ninth, eleventh, fourteenth, and twenty-first; so that the greatest influence was attributed to the seventh, next to the fourteenth, and then to the twenty-first. And therefore, with regard to the nourishment of the sick, they waited for the fits of the odd days; then afterwards they gave food, expecting the approaching fits to be easier; insomuch that Hippocrates, if the fever had ceased on any other day, used to be apprehensive of a relapse."¹

These critical days were believed by Hippocrates and most of the other ancient physicians to be influenced by the moon.

Greek medicine was divided into five parts, and to this day these divisions are still maintained. They were (1) Physiology and Anatomy considered together; (2) Ætiology, or the doctrine of the causes of disease; (3) Pathology; (4) Hygiene, or the art of preserving the

¹ Celsus, *Of Medicine*, chap. iv. Futvoye's Trans.

health ; (5) Semeiology, or the knowledge of the symptoms of disease and diagnosis, and Therapeutics, or the art of curing diseases.

As to the contending claims of the various Greek schools of medicine, Dr. Adams says,—

“There is no legitimate mode of cultivating medical knowledge which was not followed by some one or other of the three great sects into which the profession was divided in ancient times.”¹

With respect to the professional income of Greek physicians, Herodotus states² that the Æginetans, about 532 B.C., paid Democedes one talent a year from the public treasury for his services, *i.e.* about £344. From the Athenians he afterwards received a sum amounting to about £406 per annum. When he removed to Samos, Polycrates paid him a salary of two talents, or £487 10s. A difficulty arises, however, as to this statement of Herodotus, and there may have been an error in the sums mentioned.³

The procuring of abortion was not in ancient Greece always considered a very great crime, and amongst the Romans it seems to have been unnoticed originally. It is related by Cicero that he knew of a case in Asia where a woman was put to death for having procured the abortion of her own child. Under the emperors, the punishment was exile or condemnation to the mines.

THE SCYTHIANS.

Of medicine as practised amongst the Scythians, little is known.

Herodotus says⁴ that when the king of the Scythians was sick he sent for three soothsayers, who proceeded to discover by divination the cause of his majesty's malady. The prophets generally said that such or such a citizen had sworn falsely by the royal hearth, mentioning the name of the citizen against whom they brought the charge. The accused, having been arrested, was charged with causing the king's illness. When he denied it, the king sent for twice as many more prophets ; if these confirmed the charge, the offender was promptly executed ; if they failed to do so, the first prophets were put to death. Abaris, the Hyperborean priest of Apollo, cured diseases by incantations, and delivered the world from a plague, according to Suidas. Anarcharsis, the Scythian philosopher, flourished 592 B.C. ; if he knew anything of medicine, as has been said, he was probably acquainted with such knowledge of the art as was possessed by the Greeks.

¹ Dr. Francis Adams. Preface to Works of *Paulus Ægineta*, p. xii.

² iii. 131.

³ Smith's *Dict. Ant.*, p. 611.

⁴ *Herodotus*, iv. 68.

The ancient physicians seemed to have had no idea of the necessity for observing any order in their interpretation of diseases; even in the middle ages, says Sprengel,¹ they merely followed the position of the parts of the body, "passing from the head to the chest, from the thorax to the abdomen, and from the belly to the extremities."

In that branch of modern medical science which treats of the classification of diseases, and which is termed Nosology, a systematic arrangement is followed, and the prominent symptoms are taken as the basis of that classification.

GREEK MEDICAL LITERATURE.

The following is Dr. Greenhill's probably complete list of the ancient treatises on Therapeutics now extant.²

Hippocrates: Seven Books (see p. 178 of this work). Aretæus, *Περὶ Θεραπείας Ὁξέων καὶ Χρονίων Παθῶν, De Curatione Acutorum et Diuturnorum Morborum*, in four books. Galen, *Τέχνη Ἱατρικὴ, Ars Medica*; Id. *Θεραπευτικὴ Μέθοδος, Methodus Medendi*; Id. *Τὰ πρὸς Γλαύκωνα Θεραπευτικά, Ad Glauconem de Medendi Methodo*; Id. *Περὶ Φλεβοτομίας πρὸς Ἐρασίστρατον, De Venæsectione adversus Erasistratum*; Id. *Περὶ Φλεβοτομίας πρὸς Ἐρασιστρατείου τοὺς ἐν Ῥώμῃ, De Venæsectione adversus Erasistrateos Romæ Degentes*; Id. *Περὶ Φλεβοτομίας Θεραπευτικὸν Βιβλίον, De Curandi Ratione per Venæsectionem*; Id. *Περὶ Βδελλῶν, Ἀντισπασέως, Σικύας, καὶ Ἐγχαράξεως, καὶ Καταχασμοῦ, De Hirudinibus, Revulsione, Cucurbitula, Incisione, et Scarificatione*. Alexander Aphrodisiensis, *Περὶ Πυρετῶν, De Febris*. Great part of the *Συναγωγαὶ Ἱατρικαί, Collecta Medicinalia*, of Oribasius, and also of his *Σύνοψις, Synopsis ad Eustathium*, treat of this subject. Palladius, *Περὶ Πυρετῶν Σύντομος Σύνοψις, De Febris Concisa Synopsis*. Aëtius, *Βιβλία Ἱατρικὰ Ἑκκαίδεκα, Libri Medicinales Sedecim*. Alexander Trallianus, *Βιβλία Ἱατρικὰ Δωκαίδεκα, Libri de Re Medica Duodecim*. Paulus Ægineta, *Ἐπιτομὴς Ἱατρικῆς Βιβλία Ἑπτα, Compendii Medici Libri Septem*, of which great part relates to this subject. Theophanes Nonnus, *Ἐπιτομὴ τῆς Ἱατρικῆς Ἀπάσης Τέχνης, Compendium Totius Artis Medicinæ*. Synesius, *Περὶ Πυρετῶν, De Febris*. Joannes Actuarius, *Methodus Medendi*. Demetrius Pepagomenus, *Περὶ Ποδάγρας, De Podagra*. Celsus, *De Medicina*, in eight books. Cælius Aurelianus, *Celerum Passionum, Libri iii*. Id. *Tardarum Passionum, Libri v*. Serenus Samonicus, *De Medicina Præcepta Saluberrima*, a poem on the art of Healing. Theodorus Priscianus, *Rerum Medicarum, Libri iv*.

¹ *Hist. de la Méd.*, vol. vi. p. 28.

² Smith's *Dict. Ant.*, art. "Therapeutica."

EXAMPLES OF ANCIENT SURGERY.



Fig. 1.

Representation of the mode of reducing dislocation of the thigh outwards, as given by M. Littré.

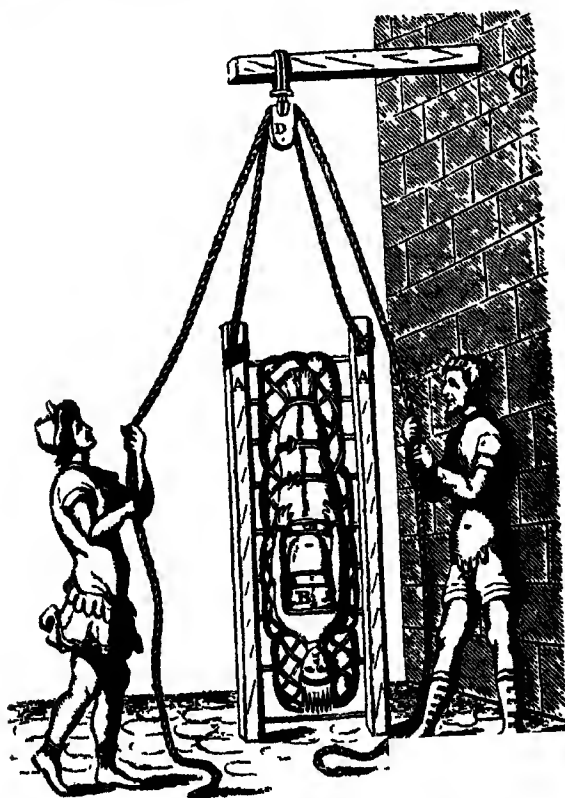


Fig. 2.

Representation of the ancient mode of performing succussion, as given by Vidus Vidius in the Venetian edition of Galen's works (*Cl. vi.*, p. 271).

[Face p. 204.]

CHAPTER IV.

THE EARLIER ROMAN MEDICINE.

Disease-Goddesses.—School of the Methodists.—Rufus and Marinus.—Pliny.—Celsus.

How medical instruction was first given to the Romans cannot be ascertained with certainty; the want of it must have frequently been forced upon the attention of the authorities. It was the practice of the soldiers to dress each other's wounds; they carried bandages with them for this purpose; but their surgery must have been very indifferent, for Livy tells us that, after the battle of Sutrium (B.C. 309), more soldiers were lost by dying of their wounds than were killed by the enemy.

As the Etruscans were famous for their knowledge of philosophy and medicine, the Romans probably acquired something of these sciences from this ancient people; but that they were more apt at learning their superstitions than their arts of healing, we have proof enough. Whether the Romans were more indebted to the Etruscans or to the Sabine people for their religion is a question which has been discussed. It would seem that Numa Pompilius, the legendary king of Rome, was of Sabine origin, and that he possessed some acquaintance with physical science and philosophy. He dissuaded the Romans from idolatry. Livy's account of his experiments, in consequence of which he was struck by lightning, has been considered by some writers as evidence that he was acquainted with electricity.¹

How intellectually inferior the ancient Romans were in comparison with the Greeks, may be learned from the fact that Pliny tells us that "The Roman people for more than 600 years were not, indeed, without medical art, but they were without physicians." Such mental culture as the Romans possessed was imported from Greece, and until the Greeks instructed them in medicine they possessed nothing but a theurgic system of treating disease by prayers, charms, prescriptions from the Sibylline books, and the rude surgery and domestic medicine of the barbarians. Guilty of degrading superstitions unknown to the Greeks, the list of their gods and goddesses of disease reads like the accounts

¹ *Titus Livius*, lib. i., cap. xxxi. Pliny, *Hist. Nat.*, lib. xxviii., c. ii.

of the healing art from some savage nation. Fever and stench were worshipped as the goddesses Febris and Mephitis; Fessonia helped the weary, says St. Augustine,¹ and "sweet Cloacina" was invoked when the drains were out of order.²

The itch patients invoked the goddess Scabies and the plague-stricken the goddess Angeronia; women sought the aid of Fluonia and Uterina, and Ossipaga was goddess of the navel and bones of children. There were many goddesses of midwifery; Carna presided over the abdominal viscera, and sacrifices of beans and bacon were offered to her. St. Augustine pours his satire and contempt on the women's goddesses in the eleventh chapter of the book from which we have quoted. The Romans were cosmopolitan in the way of divinities; Isis and Serapis were imported from Egypt, the Cabiri from the Phœnicians, and the worship of Æsculapius was commenced by the Romans, B.C. 294.³

Certain facts in the history of the Romans prove that there was a profession of medicine in Rome even in very early times. Plutarch, in his *Life of Cato the Censor*, speaks of a Roman ambassador who was sent to the king of Bithynia, and who had his skull trepanned. By the Lex Aquilia a doctor who neglected a slave after an operation was responsible if he died in consequence, and in the Twelve Tables of Numa mention is made of dental operations.

A college of Æsculapius and of Health was established in Rome 154 B.C. An inscription has been discovered in the excavations of the Palatine which has preserved the memorial of its foundation.⁴ The medical profession of ancient Rome was quite free, and such instruction as its followers considered it necessary to acquire could be obtained how and where they chose. There was no uniform system of education; the training was private in early times, and was imparted by such physicians as cared to take pupils for a certain specified honorarium. It was not till later times that the Archiatri in their colleges, which were somewhat on the model of the mediæval guilds, took pupils for instruction in medicine and surgery. Pure medical schools did not exist amongst the Romans.⁵ Pliny complained⁶ "that people believed in any one who gave himself out for a doctor, even if the falsehood directly entailed the greatest danger." "Unfortunately there is no law which punishes doctors for ignorance, and no one takes revenge on a doctor if, through his fault, some one dies. It is permitted him by our danger to learn for the future, at our death to make experiments, and,

¹ *De Civ. Dei.*, lib. iv. cap. xxi.

² *Ibid.*, cap. xxiii.

³ Baas, *Hist. Med.*, p. 131.

⁴ Puschmann, *Hist. of Med. Educ.*, p. 86.

⁵ *Ibid.*, p. 97. Baas, *Hist. Med.*, p. 152.

⁶ *Hist. Nat.*, xxix. 8.

without having to fear punishment, to set at naught the life of a human being."

Cato hated physicians, partly because they were mostly Greeks, and, partly because he was himself an outrageous quack, who thought himself equal to a whole college of physicians. Plutarch tells us¹ that he had heard of the answer which Hippocrates gave the king of Persia, when he sent for him and offered him a reward of many talents: "I will never make use of my art in favour of barbarians who are enemies of the Greeks." He affected to believe that all Greek physicians took a similar oath, and therefore advised his son to have nothing to do with them. But there is no doubt his objection to the faculty arose from the fact that he had "himself written a little treatise in which he had set down his method of cure." Cato's guide to domestic medicine was good enough for the Roman people; what did they want with Greek physicians? His system of diet, according to Plutarch, was peculiar for sick persons; he did not approve of fasting, he permitted his patients to eat ducks, geese, pigeons, hares, etc., because they are a light diet suitable for sick people. Plutarch adds, that he was not in his own household a very successful practitioner, as he lost his wife and son. Pliny² tells us all about Cato's book of recipes, which the Roman father of a family consulted when any of his family or domestic animals were ill. The family doctor of those days was the father or the master of the household, and no doubt Cato was a very generous, if not a very skilful practitioner. Seneca sums up the healing art of the time thus: "*Medicina quondam paucarum fuit scientia herbarum quibus sisteretur fluens sanguis, vulnera coirent.*"³

Cato attempted to cure dislocations by magic songs (*carmina*): "*Huat, hanat, ista, pista sista damniato damnaustra,*" or nonsense simply. What his success in the treatment of luxations on this principle we are not informed. The practice of medicine and surgery before the time of Cæsar was not an honourable one in Rome. This may possibly have arisen from the fact that the only professors of the art were Greeks, who for the most part left their country for their country's good and went to Rome merely to make money, honestly if possible—perhaps—but at all events to make it. Rome offered greater facilities for doing this than their native land, and the process was doubtless very similar to that with which our own colonies and the United States of America have in the past been only too familiar.⁴

During the severe epidemics which often raged in ancient Rome the oracles were consulted as to the means to be adopted to be rid of

¹ *Life of Cato the Censor.*

² *Hist. Nat.*, xxix. cap. 8.

³ *Epist.* 93.

⁴ See Baas, *Hist. of Med.*, and Dr. Habershon's note on this subject, p. 133.

them ; prayers were offered up to the Greek gods of healing as well as those of the state. But Greece had done more for the art of healing by her physicians than her gods could do, and in process of time the Romans found this out, and the native doctors were compelled to yield before the advance of Greek science. The works of the Greek physicians and surgeons, who had done so much for medical knowledge and advancement, gradually made their way amongst the Romans. These paved the way for Hellenic influence, in spite of the disreputable behaviour of some of the professors of the art of medicine, on whom the Romans with good excuse looked as quacks and foreigners whose only object was gain. We read of the erection at Rome of a temple in honour of Apollo the healer, 467 B.C., and of the building of a temple to Æsculapius of Epidaurus, 460 B.C. Ten years later the Romans built a temple to the goddess *Salus* when the pestilence raged in their city. Lucina was first worshipped there 400 B.C. In 399 B.C. the first *lectisternium*, a festival of Greek origin, was held in Rome by order of the Sybilline books ; it was held on exceptional occasions, the present being a time of fresh public distress on account of a pestilence which was raging. The images of the gods were laid on a couch ; a table spread with a meal was placed before them, and solemn prayers and sacrifices were offered. A third *lectisternium* was held at Rome 362 B.C. That he might obtain a cessation of the pestilence then raging in Rome, L. Manlius Imperator fixed a nail in the temple of Jupiter, B.C. 360. This holding of lectisternes and driving nails in the temple walls became the recognised method of dealing with such scourges, and painfully exhibits the powerlessness of mankind to deal with disease by theurgic means. Science alone can combat disease, the bed and board offered to the gods who cannot use them are now bestowed on health officers who can ; we no longer drive nails in temple walls to remind deities that we are in trouble, but we send memorials to our colleges of physicians demanding suggestions for escaping a visitation of cholera ; it is not sufficient to fix "a nail in a sure place," it must be fixed in the right one. In the year 291 B.C., on the occasion of a pestilence in Rome, ten ambassadors were sent to Epidaurus to seek aid from the temple of Æsculapius. The god was sent to the afflicted city under the figure of a serpent. He comes to our towns now under the figure of a cask of carbolic acid.

ARCHAGATHUS was the first person who regularly practised medicine in Rome. He was a Peloponnesian who settled in the city B.C. 219, and was welcomed with great respect by the authorities, who purchased a surgery or shop for him at the public expense, and gave him the "*Jus Quiritium*."

As he treated his patients chiefly with the knife and powerful caustics, his severe remedies gave great offence to the people and brought the profession of surgery into contempt. He was called a "butcher," and had to leave the city.¹

ALEXANDER SEVERUS (225-235 A.D.) was the first who established public lecture rooms for teachers of medicine and granted stipends to them. In return they were compelled to teach poor state-supported students gratuitously. Constantine demanded like services from the doctors in return for certain immunities.²

There was no regular curriculum, nor period of studentship; everything depended upon the ability and industry of the individual pupil. Clinical instruction was given by the teachers, as Martial tells in a satirical verse :—

"Faint was I only, Symmachus, till thou,
Backed by an hundred students, throng'dst my bed ;
An hundred icy fingers chilled my brow :
I had no fever ; now I'm nearly dead !"

(Dr. Henderson's Trans.)

Anatomy had been pretty thoroughly taught in the Roman Empire. RUFUS OF EPHEBUS, who lived probably in the reign of Trajan, A.D. 98-117, was a very famous anatomist. He considered the spleen to be absolutely useless : a belief which lasted to quite modern times. The nerves we call recurrent were probably then only recently discovered. He proved that the nerves proceed from the brain, and divided them into those of sensation and those of motion. He considered the heart to be the seat of life, and remarked that the left ventricle is smaller and thicker than the right. He discovered the crossing (decussation) of the optic nerves, and made several important researches in the anatomy of the eye. He wrote on diseases of the mind, and discussed medicines in poetry.

MARINUS, a celebrated physician and anatomist, lived in the first or second-century of our era. He wrote many anatomical treatises, which Galen greatly praised, and he commented upon Hippocrates. He knew the seven cranial nerves, and discovered the inferior laryngeal nerve and the glands of the intestines.

QUINTUS, Galen's tutor, was one of his pupils. LYCUS was a pupil of Quintus, who wrote anatomical books of some reputation. PELOPS was also one of Galen's earliest tutors, and was a famous anatomist and physician at Smyrna. ÆSCHRYON, a native of Pergamos was another of Galen's tutors, and had a great knowledge of pharmacy and materia medica. He was the father of all those who invent superstitious

¹ Bostock, *Hist. of Med.*

² Puschmann, *Hist. Med. Educ.*, p. 98.

remedies for the bite of a mad dog by means of cruelty. For this he directs crawfish to be caught at a time when the sun and moon were in a particular position, and to be baked alive. A worthy combination, it will be perceived, of superstition, astrology, and purposeless cruelty.

Although anybody might practise medicine in Rome without let or hindrance, the Lex Cornelia ordered the arrest of the doctor if the patient died through his negligence (88 B.C.).

There was a public sanitary service and other Government employments which demanded properly instructed doctors in ancient Rome, and the practice of specialism in the treatment of disease was carried to even greater lengths than at present. Martial satirises this.¹

In the time of Strabo and in that of Trajan there were public medical officers in Gaul, Asia Minor, and in Latium. In Rome there were district medical officers for every part of the city. They were permitted to engage in private practice, but were compelled to attend the poor gratuitously. Their salary, according to Puschmann,² was paid chiefly in articles of natural produce.

The *archiatri populares* were the district physicians. The court physicians were called *archiatri palatini*. The *archiatri municipales* were municipal physicians. Their guild was the COLLEGIUM ARCHIATRORUM, which in constitution was not unlike our Royal College of Physicians.

Different societies employed doctors; the theatres, gladiators, and the circus retained surgeons.

The art of ophthalmic surgery first became a separate branch of the medical profession in the city of Alexandria. Celsus states that PHILOXENUS, who lived two hundred and seventy years before Christ, was the most celebrated of the Alexandrian oculists.³

Oculists were a numerous but ignorant class of practitioners in ancient Rome; their treatment was almost always by salves, each eye-doctor having his own specialty. Nearly two hundred seals with the proprietors' names have been discovered which have been attached to the pots containing the ointments. Galen speaks contemptuously of the science of the eye-doctors of his time. Martial satirises them. "Now you are a gladiator who once were an ophthalmist; you did as a doctor what you do as a gladiator." In another epigram he says, "The blear-eyed Hylas would have paid you sixpence, O Quintus; one eye is gone, he will still pay threepence; make haste and take it, brief is your chance, when he is blind he will pay you nothing." Under Nero, DEMOSTHENES PHILALETHES, the famous doctor of

¹ *Epigrams*, x. 56.

² *Hist. Med. Educ.*, p. 131.

³ Cels., lib. vii. p. 337, ed. Targ. Sprengel, *Hist. de la Méd.*, tom. vii. p. 38.

Marseilles, was a celebrated oculist, whose work on eye diseases was the chief authority on the subject until about A.D. 1000. Paulus Ægineta, in his treatise on Ophthalmology, recommends crocodile's dung in opacity of the cornea, and bed-bugs' and frogs' blood in trichiasis; yet with all this absurdity he distinguished between cataract and amaurosis.

The ophthalmological literature of the Greeks and Romans has for the most part perished. Puschmann says that this branch of surgery must have been able to show remarkable results. "Not only trichiasis, hypopyon, leucoma, lachrymal fistula, and other affections of the external parts of the eye were subjected to operative treatment, but even cataract itself."¹

Although the surgeons of the time were ignorant of the true nature of some of the diseases which they treated, they could cure them. Cataract was treated by "couching," or depressing the diseased lens by means of a needle, in order to extract it.²

A patient would sometimes require a consultation, when several doctors would meet and discuss his case, with much difference of opinion more or less violently expressed. Regardless of the sufferings of the patient, they wrangled over his symptoms, and behaved as if they were engaged in a pugilistic encounter, each man far more anxious to exhibit his parts and display his dialectical skill than to alleviate the sufferings of the unfortunate client. Pliny, Galen, and Theodorus Priscianus have left realistic descriptions of these medical encounters.

With respect to the professional income of the early Roman physicians, Pliny says³ that Albutius, Arruntius, Calpetanus, Cassius, and Rubrius gained 250,000 sesterces per annum, equal to £1,953 2s. 6d.; that Quintus Stertinius made it a favour that he was content to receive from the emperor 500,000 sesterces per annum, or £3,906 5s., as he might have made 600,000 sesterces, or £4,687 10s., by his private practice. He and his brother, also an Imperial physician, left between them at their death the sum of thirty millions of sesterces, or £234,375, notwithstanding the large sums they had spent on beautifying Naples.⁴ Galen's fee for curing the wife of the consul Boethus, after a long illness, was about equal to £400 of our money.

Manlius Cornutus, according to Pliny, paid his doctor a sum amounting to £2,000 for curing him of a skin disease; and the doctors Crinas and Alcon, according to the same authority, were immensely rich men. But these were all exceptional cases, and there is no reason to suppose

¹ *Hist. of Med. Educ.*, p. 117.

² Galen, x. 987. Plin., *Nat. Hist.*, xxix. 8.

³ *Nat. Hist.*, xxix. 5.

⁴ Smith's *Dict. Ant.*, p. 611.

that Roman doctors made on the average more than sufficient to keep them decently.¹

SCHOOL OF THE METHODISTS.

ASCLEPIADES, of Prusa, in Bithynia, was a physician of great celebrity and influence, who flourished at Rome in the beginning of the first century B.C. He passed his earlier years at Alexandria, then went to Athens, where he studied rhetoric and medicine. He is said to have travelled much. He ultimately settled at Rome as a rhetorician. He was the friend of Cicero. Being unsuccessful as a teacher of rhetoric, he devoted himself to medicine. He was a man of great natural ability, but he was quite ignorant of anatomy and physiology; so he decried the labours of those who studied these sciences, and violently attacked Hippocrates. His conduct was that of an early Paracelsus. He had many pupils, and the school they founded was afterwards called that of the Methodists. His system was original, though it owed somewhat to the Epicurean philosophy. He conceived the idea that disease arose in the atoms and corpuscles composing the body, by a want of harmony in their motion. Harmony was health; discord, disease. Naturally his treatment was as pleasant as that of the most fashionable modern physician. He paid great attention to diet, passive motions, frictions after the method now called massage, and the use of cold sponging. He entirely rejected the humoral pathology of Hippocrates, and totally denied his doctrine of crises, declared that the physician alone cures, nature merely supplying the opportunities. His famous motto was that the physician should cure "tuto, celeriter, ac jucunde." In the beginning of fevers he refused his patients permission even to rinse the mouth. He originated the method of cyclical cures by adopting certain methods of treatment at definite periods. He first applied the term "phrenitis" in the sense of mental disturbance. In drugs he was a sceptic, but he allowed a liberal use of wine. He was said to have experimented in physiology, though he knew nothing of it. Tertullian ridicules him thus: "Asclepiades may investigate goats, which bleat without a heart, and drive away flies, which fly without a head."

Asclepiades must have been a great deal more than a charlatan, for many of his fundamental ideas have persisted even to the present time. He was the first to distinguish diseases into acute and chronic.² Acute diseases he supposed to depend "upon a constriction of the pores, or an obstruction of them by a superfluity of atoms; the chronic upon a relaxation of the pores, or a deficiency of the atoms." Asclepiades was

¹ Puschmann's *Med. Educ.*, p. 126.

² Cael. Aurel., *De Morb. Chron.*, iii. 8.

the inventor of many new methods in surgery and medicine. Amongst these was bronchotomy for the relief of suffocation.¹ He practised tracheotomy in angina, and scarification of the ankles in dropsy, and recommended tapping with the smallest possible wound. He also observed spontaneous dislocation of the hip joint.² Such things do not emanate from mere quacks.

It may be remarked that there were many physicians of the name of Asclepiades. It was a way they had of assuming a connection with the famous medical family of that name.

The disciples of Asclepiades were called Asclepiadists. A few of them became celebrities in their day.

PHILONIDES OF DYRRACHIUM lived in the first century, and wrote some forty-five works on medicine.

ANTONIUS MUSA lived at the beginning of the Christian era, and was a freedman and physician to the Emperor Augustus. When his Imperial patient was seriously ill and had been made worse by a hot regimen and treatment, Antonius cured him with cold bathing and cooling drinks. Augustus rewarded him with a royal fee and permission to wear a gold ring, and a statue was erected to him near that of Æsculapius by public subscription. He wrote several works on pharmacy. He was also physician to Horace.

MUSA introduced into medicine the use of adder's flesh in the treatment of malignant ulcers; he discovered some of the properties of lettuce, chicory, and endive. Many of his medicines continued in use for ages. For colds he used the over-potent remedies henbane, hemlock, and opium. He was also celebrated for various antidotes which he discovered.³

His brother, named EUPHORBIOUS, was a physician also, and gave his name to a genus of plants, the *Euphorbiaceæ* (Plin., lib. xxv., c. 7).

THEMISON OF LAODICEA (B.C. 50) was the founder of the school known as the Methodical. This was a rival to that of the Hippocratic system, which had hitherto been the dominant one. Themison was the most important pupil of Asclepiades. He wrote on chronic diseases, and was the first to describe elephantiasis in a treatise. He would have written upon hydrophobia, but having in his youth once seen a case, it so frightened him that he was attacked with some of the symptoms, and dreaded a relapse if he set himself to write about it.⁴ He invented several famous remedies, such as diacodium, a preparation of poppies, and diagrydium, a purgative of scammony. Asclepiades had his "atoms," Themison had his "pores." You cannot

¹ Sprengel, *Hist. de la Méd.*, vol. vi. p. 138.

² Sprengel, *Hist. de la Méd.*, vol. ii. p. 24.

³ Baas, *Hist. of Med.*, p. 137.

⁴ Baas, *Hist. of Med.*, p. 140.

found a medical system without flying a particular flag. Themison's "flag" was the "status strictus," or "laxus" of the pores; that is to say, disease is either a condition of increased or diminished tension. He was the first who described rheumatism, and probably the first European physician who used leeches.¹

He is said to have been attacked with hydrophobia, and to have recovered. Juvenal satirised him (probably) in the lines—

"How many patients Themison dispatched
In one short autumn!"²

Themison's principles differed from those of his master in many respects, and besides rectifying his errors he introduced a greater precision into his system.³

He chose a middle way between the doctrines of the Dogmatists and Empirics. Writing of the Methodists, Celsus says: "They assert that the knowledge of no cause whatever bears the least relation to the method of cure; and that it is sufficient to observe some general symptoms of distempers; and that there are three kinds of diseases, one bound, another loose, and the third a mixture of these."⁴ Sometimes the excretions of the sick are too small, sometimes too large; one particular excretion may be in excess, another deficient; the observation of these things constitutes the art of medicine, which they defined as a certain way of proceeding, which the Greeks called *Method*. They deduced indications of treatment from analogies in symptoms, and made a bold classification of diseases; accurate as a rule in their diagnosis, they were usually successful and rational in their therapeutics. They entirely ignored any consideration of the remote causes of diseases; their only object was to cure their patients without speculating as to the reasons why they had become sick. They repudiated the *Vis medicatrix* theory.

EUDEMUS (B.C. 15) was a disciple of Themison. Cælius Aurelianus says of him that in his practice he used to order clysters of cold water for patients suffering from the iliac passion. It is probable that he was the friend and physician of Livilla, and the man who poisoned her husband Drusus. Tacitus speaks of him, saying that he made a great parade of many secret remedies, with a view to extol his own abilities as a doctor. It is possible, however, that this may not have been the same Eudemus as the disciple of Themison the Methodist, as there were several other physicians of that name. Our Eudemus made many

¹ Cæl. Aurel., *De Morb. Chron.*, i. l. p. 286.

² *Sat.*, x. 221.

³ Galen, *Introd.*, c. l., tom. xiv., pp. 663, 684. Ed. Kühn.

⁴ *De Medic.*, lib. i., Pref.

observations on hydrophobia, and remarked how rarely any sufferer recovered who was attacked by it. He was put to death by order of Tiberius.

MEGES, of Sidon (B.C. 20), was a famous surgeon, and a follower of Themison. He invented instruments used in cutting for the stone. He made observations on tumours of the breast and forward dislocations of the knee. He was regarded by Celsus as the most skilful of those who exercised the art of surgery.

VECTIUS VALLENS (*circa* A.D. 37) was a pupil of Apuleius Celsus, and was well known for his connection with Messalina, the wife of Claudius. He belonged to Themison's sect, and is introduced by Pliny in fact as the author of an improvement upon it. It was the practice of all the adherents of the Methodist school of medicine to pretend that by the changes they had introduced into the system they had originated a new one.¹

SCRIBONIUS LARGUS (A.D. 45) is said to have been physician to Claudius, and to have accompanied him to Britain. He wrote several medical works in Latin. He was the first to prescribe the electricity of the electric ray in cases of headache.²

A. CORNELIUS CELSUS, who flourished between B.C. 50 and A.D. 7, was a celebrated patrician Roman writer on medicine, and an encyclopædic compiler of a very high order. It is disputed whether he was or was not a physician in actual practice; probably he was not. He practised certainly, but on his friends and servants, and not professionally. The medical practice of the period was for the most part in the hands of the Greeks. We owe little to the Romans that was original or important in connection with the healing art, yet in Celsus we have an elegant and accomplished historian of the medical art as it was practised in ancient Rome; he wrote not so much for doctors as for the instruction of the world at large. His works were not studied by medical men, at any rate, as anything more than mere literature. No medical writer of the old world quotes Celsus. Pliny merely refers to him as an author. Very probably he merely compiled his treatises, of which the most celebrated is his *De Medicina*, in the introductions to the 4th and 8th books of which there is evidence of his considerable knowledge of anatomy. He seems to have understood the anatomy of the chest and the situation of the greater viscera especially well, though of course in this respect falling far short of our present knowledge of the science, and not in every case fully up to that of the Greeks. His knowledge of surgery was considerable, especially that of the pelvic organs of the

¹ Le Clerc, *Hist. Méd.*, Part II., liv. iv., sec. i., ch. i.

² Baas, *Hist. of Med.*, p. 143.

female. In osteology, or the science of the bones, he excelled. He accurately describes the bones of the skull, their sutures, and the teeth. His descriptions of the vertebræ and ribs, the bones of the pelvis and the upper and lower extremities, are accurate and careful. He understood the articulations, and is careful to emphasize the fact that cartilage is always found in their formation. He must have been acquainted with the perforated plate of the ethmoid bone, as he speaks of the many minute holes in the recess of the nasal cavities, and it is even inferred by Portal that he knew the semicircular canals.¹

The 7th and 8th books of the *De re Medicinâ* relate entirely to surgery; this is of course Greek, which in its turn was probably of Egyptian and Indian origin. He describes operations such as we now call "plastic," for restoring lost or defective portions of the nose, lips, and ears. These are constantly claimed as triumphs of modern surgery, and have been asserted to have been successful as the result of information derived from experiments on living animals. His description of lithotomy is that which was anciently practised in Alexandria, and was doubtless derived from India. Trephining the skull is described, and this again is proved not to have been invented in modern times, as some have thought. Even subcutaneous urethrotomy was a practice followed in the time of Celsus. We have also the first detailed description of the amputation of an extremity. Many ophthalmic operations are described according to the methods followed by the eye specialists of Alexandria.²

In his eight books on medicine the first four deal with internal complaints, such as usually yield to careful dieting. The fifth and sixth are concerned with external disorders, and contain many prescriptions for their treatment. The seventh and eighth, as we have seen, are exclusively surgical. Celsus followed principally Hippocrates and Asclepiades as his authorities. He transfers many passages from the Father of Medicine word for word. His favourite author was Asclepiades, and it is for that reason that he is held to be of the Methodical school of medicine. He was no believer in the mysterious numbers of the Pythagorean, and was evidently quite free from slavish devotion, even to his great authorities in medicine.

He recommends that dislocations should be reduced before inflammation sets in. When fractures fail to unite, he recommends extension and rubbing together of the ends of the bone. He goes so far as to advise cutting down to the bone, and letting the fracture and wound heal together. He cautions against the use of purgatives in strangu-

¹ Prof. W. Turner, art. "Anatomy," *Ency. Brit.*

² Dr. Ch. Creighton, art. "Surgery," *Ency. Brit.*

lated hernia, and gives directions for extracting foreign bodies from the ears.

Had it not been for the works of Celsus, many operations of ancient surgery would have remained to us undescribed. He writes at length on bleeding, and describes the double ligation (or tying) of bleeding vessels, and the division of the vessels between the ligatures : an operation which the defenders of experiments on animals claim to have been discovered by vivisection. His method of amputation in gangrene by a single circular cut was followed down to the seventeenth century. He describes the process of catheterization, operations for goitre (or Derbyshire neck), the resection of the ribs, the use of enemas, and artificial feeding by them, an operation for cataract, ear diseases which are curable by the use of the ear syringe, extraction of teeth by forceps, fastening loose teeth by means of gold wire, and bursting hollow teeth by peppercorns pressed into them. He describes many of the most difficult subjects of operative midwifery, and discriminates in various mental diseases. Sleep must be induced, he says, in cases of insanity, by narcotics, if it is absent. He treats eye diseases with mild lotions and salves, and is the first writer to distinguish hallucinations of vision. He copies from Asclepiades his valuable rules of diet and simple methods of treatment, and from Hippocrates his methods of recognising the signs of diseases and their prognosis.

(I am indebted to the great work of Dr. Hermann Baas¹ for much of the above digest of the writings of Celsus.)

At the time when Celsus described the practice of medicine in Europe, bleeding was practised more freely than was the custom in the days of the great Greek physicians. The Romans went far beyond these. "It is not," said Celsus, "a new thing to let blood from the veins, but it is new that there is scarcely any malady in which blood is not-drawn. Formerly they bled young men, and women who were not pregnant, but it had not been seen till our days that children, pregnant women, and old men were bled." And it would seem that already doctors had begun to bleed in almost every case, in every time of life, with or without reason, the unfortunate people who were under their care. They bled for high fever, when the body was flushed and the veins too full of blood ; and they bled in cachexia and anæmia, when they had not enough blood, but were full of "ill humours." They bled in pleurisy and pneumonia, and they bled in paralysis, and cases where there was severe pain.

Celsus has given us a good description of the qualities which a surgeon ought to possess : he should be young, or at any rate not very old ; his

¹ *Grundriss der Geschichte der Medicin.*

hand should be firm and steady, and never shake; he should be able to use his left hand with as much dexterity as his right; his sight should be acute and clear; his mind intrepid and pitiless, so that when he is engaged in doing anything to a patient, he may not hurry, nor cut less than he ought, but finish the operation just as if the cries of the patient made no impression upon him.¹

Celsus said,² "It is both cruel and superfluous to dissect the bodies of the living, but to dissect those of the dead is necessary for learners, for they ought to know the position and order, which dead bodies show better than a living and wounded man. But even the other things, which can only be observed in the living, practice itself will show in the cures of the wounded, a little more slowly, but somewhat more tenderly."

He wrote on history, philosophy, oratory, and jurisprudence, and this in the most admirable style.

THESSALUS of Tralles (A.D. 60) was the talented son of a weaver, who became a "natural" doctor. He was an utterly ignorant, bragging charlatan, with great natural ability. Had Paracelsus received no education, he might have practised medicine as a second Thessalus of Tralles. He scorned science as much as Paracelsus loved it, but like him he abused in the most violent manner all the physicians of antiquity. He called them all bunglers, and himself the "Conqueror of Physicians" (*ιατροίκης*). He declared to Nero that his predecessors had contributed nothing to the progress of the science. He flattered the great and wealthy, and vaunted his ability to teach anybody the healing art in six months. He surrounded himself with a great crowd of disciples—rope-makers, cooks, butchers, weavers, tanners, artisans of all sorts. All these he permitted to practise on his patients, and to kill them with impunity. Since his time, says Sprengel, the Roman physicians gave up the custom of visiting their patients when accompanied by their pupils.³ He used colchicum in the treatment of gout.

PHILUMENUS (about A.D. 80) was a famous writer on obstetrics, and described the appropriate treatment for the various kinds of diarrhœa.

ANDROMACHUS THE ELDER (A.D. 60) of Crete was the inventor of a famous cure-all called *Theriaca*. It was compounded of some sixty drugs. He was physician to Nero, and his two works *περὶ συνθεσέως φαρμάκων* were greatly praised by Galen.

SORANUS OF EPHEBUS, the son of Menandrus, was educated at Alexandria. He practised at Rome in the reigns of Trajan and Hadrian. He was one of the most eminent physicians of the Methodi-

¹ *A. C. Celsi Med. Praef.*, ad lib. 7.

² *De re Med.*, lib. 1.

³ *Hist. de la Mèd.*, vol. ii. p. 50.

cal school, and was mentioned with praise by Tertullian and St. Augustine. He wrote the only complete treatise on the diseases of women which antiquity has given to us. We find from this work that a valuable instrument used in gynæcology, and thought by many to be of modern invention—the speculum—was mentioned by Soranus as used by him. Amongst the articles used by surgeons which have been recovered from the ruins of Pompeii, these instruments have been discovered, showing that they were in regular use in ancient times. He seems to have had a complete knowledge of human anatomy, for he describes the uterus in such a manner as to show that his knowledge was acquired by dissecting the human body, and not merely from that of animals. He explained the changes induced by pregnancy, and spoke of the sympathy existing between the uterus and the breasts, which is so important for the physician to know. He must have had a greater knowledge of the scourge of leprosy than his contemporaries.

Soranus, in his work on gynæcology, advises that midwives should be temperate, trustworthy, not avaricious, superstitious, or liable to be induced to procure abortion for the sake of gain. They were to be instructed in dietetics, materia medica, and minor surgical manipulations. Soranus did not think it was requisite for them to know much about the anatomy of the pelvic organs, but they were to be able to undertake the operation of turning in faulty presentations. Only when all attempts to deliver a living child had failed was embryotomy to be performed. Juvenal and other writers intimate that these accomplished accoucheuses often developed into regular doctresses. In difficult cases they called in the assistance of physicians or surgeons.

JULIAN (A.D. 140) was the pupil of Apollinides of Cyprus. He was at Alexandria when Galen studied there. He wrote an introduction to the study of medicine, and opposed the principles of Hippocrates. Like the greater number of the Methodists he was ill-read, and Galen blamed him for having neglected the humoral pathology.¹

CÆLIUS AURELIANUS was a celebrated Latin physician, who is supposed to have lived in Rome about the first or second century. Very little is known about him, but the fact that he belonged to the Methodical school, and showed great skill in the art of diagnosis.

He wrote treatises on acute and chronic diseases, and a dialogue on the science of medicine. Next to Celsus, he is considered the greatest writer of his school. His works are based entirely on the Greek of Soranus.

He was a popular writer, as is proved by the fact that in the sixth century his works were text-books on medicine in the Benedictine

¹ Sprengel, *Hist. Méd.*, vol. ii. p. 37.

monasteries. He has well described gout and hydrophobia, and, according to Baas, was the inventor of condensed milk (1). Even auscultation is hinted at in his works, and he recommends the air of pine forests in chest diseases. His suggestions for the treatment of nervous and insane patients were far in advance of his age, as he disapproves of restraint.¹

GREEK AND ROMAN PHARMACY.

It is very difficult to decide with certainty what the ancients actually intended by the names they gave their medicines. Exact as Hippocrates and Galen usually are in their terminology, we are often at a loss to know precisely what was the nature of the remedies they employed. Alum, for example, as we understand it, is a very different thing from the alum of the ancients. What the Greeks and Romans called *alumen* and *στυπτηρία*, says Beckmann, was vitriol, or rather a kind of vitriolic earth. They were very deficient in the knowledge of saline substances. Hemlock, which is called also *Conium*, *Κόνηιον*, or *Cicuta*, was probably not the poison employed at Athenian executions. Pliny says that the word *Cicuta* did not indicate any particular species of plant, but was used for vegetable poisons in general. Dr. Mead² considers that the Athenian poison was a combination of deadly drugs; it killed without pain, and probably opium was combined with the hemlock.³ Hellebore was of two kinds, white and black, or *Veratrum album* and *Helleborus niger* respectively. Galen says we are always to understand veratrum when the word *Ἑλλέβορος* is used alone. White hellebore was used by the Greeks, says Stillé,⁴ in the treatment of chronic diseases, especially melancholy, insanity, dropsy, skin diseases, gout, tetanus, hydrophobia, tic douloureux, etc. It was mixed with other drugs to moderate the violence of its action. It fell into disuse, and is now hardly ever employed internally. It is an exceedingly dangerous drug; and was doubtless used on the "kill or cure" principle. Black hellebore was given as a purgative. Healthy people took the white variety to clear and sharpen their faculties. It fell into disuse about the fifth century after Christ. A very celebrated medicine in popular use even in modern times was *Theriaca*. Galen says that the term was properly applied to such medicines as would cure the bite of wild beasts (*θηρίων*), as those which were antidotes to other poisons (*τοῖς δηλητηρίοις*) were properly called *ἀλεξιφάρμακα*.⁵

¹ Baas, *Grund. der Ges. der Med.*, p. 144.

² *Mechanical Account of Poisons.*

³ Theophrastus, *Hist. Plant.*, ix. 17.

⁴ *National Dispensatory*, p. 1515.

⁵ Conf. Gal. Comment. in *Hippocr.*, lib. vi.; *De Morb. Vulgar.*, vi., § 5, tom. xvii. p. ii. p. 337.

Andromachus, physician to the emperor Nero, invented the most celebrated of these preparations; it was known as the *Theriaca Andromachi*, and was very similar to that of Mithridates, king of Pontus, the recipe for which was said to have been found amongst his papers after his death by Pompey. This was known to the Roman physicians under the name of *Antidotum Mithridaticum*. The composition of this medicine was varied greatly in the hands of its different preparers, and it underwent considerable alterations from age to age. Celsus first described it, with its thirty-six ingredients; then Andromachus added to it the flesh of vipers, and increased the number of ingredients to seventy-five. He described the whole process of manufacture in a Greek poem, which has been handed down to us by Galen. Damocrates varied some of the proportions of the compound, and wrote another poem upon it, also preserved by Galen.

The medicines prescribed by the Greek and Roman physicians were all prepared by themselves. At that time *materia medica* consisted chiefly of herbs; some of these plants were used not only for medicinal, but also for culinary purposes, and were collected by other than practitioners of medicine. Many plants were used also for cosmetic purposes and in the baths, so that there must have been numerous collectors and dealers in herbs. Just as in our time dispensing chemists and others have acquired a certain knowledge of the medicinal virtues of the things they sell, so the *pigmentarii*, *seplasiarii*, *pharmacopolæ*, and *medicamentarii* possessed themselves of medical secrets, and thus invaded the territory of the doctors.

Beckmann says¹ that the *pigmentarii* dealt in medicines, and sometimes sold poison by mistake.

The *seplasiarii* sold veterinary medicines and compounded drugs for physicians.²

The *pharmacopolæ*, according to Beckmann, were an ignorant and boasting class of drug-sellers. The *medicamentarii* seem to have been a still more worthless class, for in the Theodosian code poisoners are called *medicamentarii*.

A great number of the medical plants mentioned by Pliny, Dioscorides, and other writers on *materia medica* were used for quite other purposes than those for which we employ them now. Some drugs, however, were apparently given on what we must admit to be correct scientific principles. Thus Melampus of Argos, one of the oldest Greek physicians of whom we have any knowledge, is said to have cured Iphiclus of sterility by administering rust of iron in wine for ten days.

¹ *History of Inventions*, art. "Apothecaries."

² *Plin.*, lib. xxxiv. cap. 11.

He gave black hellebore as a purgative to the daughters of Proetus when they were afflicted with melancholy. Preparations of the poppy were known to have a narcotic influence, and the uses of prussic acid—in the form of cherry laurel water—stramonium, and lettuce-opium were well understood. Squill was employed as a diuretic in dropsy by the Egyptians.

The following list from the article on "Pharmaceutica" in Smith's *Dictionary of Greek and Roman Antiquities* contains probably the titles of all the ancient treatises on drugs that are extant: "1. *Περὶ Φαρμάκων, De Remediis Purgantibus*; 2. *Περὶ Ἑλληβορισμοῦ, De Veratri Usu* (these two works are found among the collection that goes under the name of Hippocrates, but are both spurious); 3. Dioscorides, *Περὶ Ἰατρικῆς, De Materia Medica*, in five books (one of the most valuable and celebrated medical treatises of antiquity); 4. *id. Περὶ Εὐπορίστων, Ἀπλῶν τε καὶ Συνθέτων, Φαρμάκων, De Facile Parabilibus, tam Simplicibus quam Compositis, Medicamentis*, in two books (perhaps spurious); 5. Marcellus Sideta, *Ἰατρικὰ περὶ Ἰχθύων, De Remediis ex Piscibus*; 6. Galen, *Περὶ Κράσεως καὶ Δυνάμεως τῶν Ἀπλῶν Φαρμάκων, De Simplicium Medicamentorum Temperamentis et Facultatibus*, in eleven books; 7. *id. Περὶ Συνθέσεως Φαρμάκων τῶν κατὰ Τόπους, De Compositione Medicamentorum secundum Locos*, in ten books; 8. *id. Περὶ Συνθέσεως Φαρμάκων τῶν κατὰ Γένη, De Compositione Medicamentorum secundum Genera*, in seven books; 9. *id. Περὶ τῆς τῶν Καθαρόντων Φαρμάκων Δυνάμεως, De Purgantium Medicamentorum Facultate* (perhaps spurious); 10. Oribasius, *Συναγωγὰ Ἰατρικὰ, Collecta Medicinalia*, consisting originally of seventy books, of which we possess now only about one third; 11. *id. Εὐπόριστα, Euporista ad Ennapium, or De facile Parabilibus*, in four books, of which the second contains an alphabetical list of drugs; 12. *id. Σύνοψις, Synopsis ad Eustathium*, an abridgment of his larger work in nine books, of which the second, third, and fourth are upon the subject of external and internal remedies; 13. Paulus Ægineta, *Ἐπιτομὴς Ἰατρικῆς Βιβλία Ἑπτὰ, Compendii Medici Libri Septem*, of which the last treats of medicines; 14. Joannes Actuarius, *De Medicamentorum Compositione*; 15. Nicolaus Myrepsus, *Antidotarium*; 16. Cato, *De Re Rustica*; 17. Celsus, *De Medicina Libri Octo*, of which the fifth treats of different sorts of medicines; 18. Twelve books of Pliny's, *Historia Naturalis* (from the twentieth to the thirty-second), are devoted to *Materia Medica*; 19. Scribonius Largus, *Compositiones Medicamentorum*; 20. Apuleius Barbarus, *Herbarium, seu de Medicaminibus Herbarum*; 21. Sextus Placitus Papyriensis, *De Medicamentis ex Animalibus*; 22. Marcellus Empiricus, *De Medicamentis Empiricis, Physicis, ac Rationalibus*.

Although the Greeks and Romans knew little of chemistry as we understand the term, they must have possessed considerable skill in the art of secret poisoning, either with intent to kill or to obtain undue influence over certain persons.

Poisonous drugs were used as philtres or love-potions, and we know from Demosthenes¹ that drugs were administered in Athens to influence men to make wills in a desired manner. Women were most addicted to the crime of poisoning amongst the Greeks. They were called *φαρμακίδες* and *φαρμακευτρίαι*. By the Romans the crime of poisoning was called *Veneficium*; and here again, as in other times and places,

¹ C. Steph., 1133.

it was most usually practised by women. It lent itself to the weakness of the gentler sex, who could not avenge their injuries by arms, and there is little doubt that many women were as unjustly suspected of poisoning as we know they were of witchcraft in an ignorant age when pestilence and obscure diseases filled the minds of the people with fear and suspicion. Thucydides tells us¹ the Athenians in the time of the great pestilence believed that their wells had been poisoned by their enemies. When the city of Rome was visited by a pestilence in the year 331 B.C., a slave girl informed the curule aediles that the Roman matrons had caused the deaths of many of the leading men of the State by poisoning them. On this information about twenty matrons, some of whom, as Cornelia and Sergia, belonged to patrician families, were detected in the act of preparing poisonous compounds over a fire. They protested that they were innocent concoctions; the magistrates compelling them to drink these in the Forum, they suffered the death they had prepared for others. Locusta was a celebrated female poisoner under the Roman emperors. She poisoned Claudius at the command of Agrippina, and Britannicus at that of Nero, who even provided her with pupils to be instructed in her deadly art. Tacitus tells the story,² Suetonius says,³ that the poison she administered to Britannicus being too slow in its action, Nero forced her by blows and threats to make a stronger draught in his presence, which killed the victim immediately. She was executed under the emperor Galba.

Clement of Alexandria refers to the Susinian ointment in use in his time; which was made from lilies, and was "warming, aperient, drawing, moistening, abstergent, antibilious, and emollient," a truly marvellous unguent indeed if it possessed only half of these virtues. He tells of another ointment called the Myrsinian, which was made from myrtle berries, and was "a styptic, stopping effusions from the body; and that from roses is refrigerating."⁴

RUFUS OF EPHESUS, the anatomist, has left us in his works interesting details concerning the state of anatomical science at Alexandria before the time of Galen. In one of his works he says, "The ancients called the arteries of the neck carotids, because they believed that, when pressed hard, the animal became sleepy and lost its voice; but in our age it has been discovered that this accident does not pro-

¹ *Peloponnesian War*, ii. 48.

² *Nero*, 33.

³ *Annal.*, xiii. c. 15, 16.

⁴ *The Instructor*, Book II.

ceed from pressing upon these arteries, but upon the nerves contiguous to them." He is said to have practised the twisting of arteries for arresting hæmorrhage, a method universally followed at the present day. It is curious that though the ligature and this valuable method of torsion were both known to the ancients, they fell into abeyance in favour of the actual cautery.

SENECA, the philosopher (A.D. 3-65), had a very high opinion of the healing art. Perhaps no one has said truer and kinder things of doctors than this philosopher. "People pay the doctor for his trouble; for his kindness they still remain in his debt." "Thinkest thou that thou owest the doctor and the teacher nothing more than his fee? We think that great reverence and love are due to both. We have received from them priceless benefits: from the doctor, health and life; from the teacher, the noble culture of the soul. Both are our friends, and deserve our most sincere thanks, not so much by their merchantable art, as by their frank good will."¹

APOLLONIUS of Tyana, the Pythagorean philosopher, was born four years before Christ. His reputation as a miracle-worker and healer was used by the enemies of the Christian faith in ancient times to bring him forward as a rival to the Author of our Religion.² The attempt to make him appear a pagan Christ has since been revived.³ He adopted the Pythagorean philosophy at the age of sixteen. He renounced animal food and wine, used only linen garments and sandals made of bark, suffered his hair to grow, and betook himself to the temple of Æsculapius, who appears to have regarded him with peculiar favour. He observed the silence of five years, which was one of the methods of initiation into the esoteric doctrines of the Pythagoreans. He travelled in India, and learned the valuable theurgic secrets of the Brahmans; in the cities of Asia Minor he had some interviews with the Magi; visited the temples and oracles of Greece, where he sometimes exercised his skill in healing; then he went to Rome, where he was brought before Nero on the charge of magical practices, which was not sustained. In his seventy-third year he attracted the notice of Vespasian. Afterwards he travelled in Ethiopia. Returning to Rome, he was imprisoned by Domitian, and had his hair cut short, because he had foretold the pestilence at Ephesus. He died at the age of an hundred years. It is to be remarked that he never put forward any miraculous pretensions himself; he seems merely to have been a learned philosopher who had travelled widely and acquired vast information from distant sources. The history manufac-

¹ Seneca, *De Benefic.*, vi. 15, 16, 17.

² John Henry Newman's *Life of Apollonius Tyanaus*.

³ By Lord Herbert and Mr. Blount.

tured for him is plainly an imitation from that of our Lord, concocted by persons interested in degrading the character of Christ.¹

PLINY THE ELDER (23-79 A.D.), the author of the immense encyclopædic work, his famous *Natural History*, was not a man of genius, nor even an original observer, his work is but a compilation, and contains more falsehood than fact, and more absurdities than either. He cannot be called a naturalist, though he wrote on natural history; nor a physician, though he wrote of diseases and their remedies. His work is valuable chiefly as a picture of the general knowledge of his time. The following is an example of the medical lore of the period. Pliny says that a woman dreamt that some one was directed to send to her son, a soldier in Spain, some roots of the dog-rose. It happened that exactly at that time her son had been bitten by a mad dog, and had received a letter from his mother, who had dreamt about him, and she begged him to use these roots as she directed. He did so, and was "protected" from hydrophobia, as were many others of his friends who adopted the same treatment. Thus it was that the wild-rose was called the dog-rose.

DIOSCORIDES lived in the first or second century of our era. He was a physician who rendered greater services than any other to *Materia Medica*. His work on this subject was the result of immense labour and research, and remained for ages the standard authority; it contained a description of everything used in medicine, and is a most valuable document for the historian of the healing art of the period. Galen highly valued the work of Dioscorides, which must have been of the greatest use to the doctors of the time, who were obliged to prepare their own medicines. Drugs were so much adulterated that it was unsafe to procure them from the stores in Rome.

MARINUS was a famous anatomist, who lived in the first and second centuries after Christ. Galen's tutor Quintus was one of his pupils. He wrote many works on anatomy, which Galen abridged and praised, saying that he was one of the restorers of anatomical science.

QUINTUS, an eminent Roman physician of the second century, was a pupil of Marinus. He was celebrated for his knowledge of anatomy.

ZENON lived in the fourth century, and taught medicine at Alexandria. Julian (A.D. 361 *circa*.) wrote in very high terms of the medical skill of this physician.

MAGNUS OF ALEXANDRIA was a pupil of the above, who lectured on medicine at Alexandria, where he was very famous. He wrote a work on the urine.

IONICUS OF SARDIS studied under Zenon. He was not only distin-

¹ Newman's *Life of Apollonius*.

guished in all branches of medicine, but was versed in rhetoric, logic, and poetry.

THEON OF ALEXANDRIA, of very uncertain period, probably in the fourth century after Christ, wrote a celebrated book on *Man*, in which he treated of diseases in a systematic order, and also of pharmacy.

CHAPTER V.

LATER ROMAN MEDICINE.

The Eclectic and Pneumatic Sects.—Galen.—Neo-Platonism.—Oribasius and Ætius.
—Influence of Christianity and the Rise of Hospitals.—Paulus Ægineta.—Ancient Surgical Instruments.

THE SECT OF THE PNEUMATISTS.

ATHENÆUS OF CILICIA about A.D. 69 founded at Rome the SECT OF THE PNEUMATISTS, at the time when the Methodists enjoyed their greatest reputation.

They admitted an active principle of an immaterial nature, to which they gave the name of πνεῦμα, spirit. This principle caused the health or the diseases of the body, and the sect was named from it. Athenæus was a Stoic, who had adopted the doctrines of the Peripatetics. In addition to the *pneuma*, he developed the theory of the elements, and in them recognised the positive qualities of the animal frame. The union of heat and moisture is necessary for the preservation of health. Heat and dryness cause acute diseases, cold and moisture produce phlegmatic disorders, cold and dryness give rise to melancholy. At death, all things dry up and become cold.¹

Great services to pathology were rendered by the Pneumatic sect. Several new diseases were discovered by them ; but they over refined their doctrines, especially that of fevers and the pulse ; they thought this alternate contraction and dilatation of the arteries was the operation of the *pneuma*, or spirit passing from the heart. *Diastole* or *dilatation* pushes forward the spirit, the *systole* or *contraction* draws it back.²

THE SECT OF THE ECLECTICS

Derived their name from the fact that they selected from each of the other sects the opinions that seemed most probable. They seem to have agreed very nearly, if they were not actually identical with the sect known as the EPISYNTHETICS. They endeavoured to join the tenets of the Methodici to those of the Empiric and Dogmatic sects, and to reconcile their differences.³

¹ Galen, *De Temperamentis*.

² Smith's *Dict. Greek and Roman Ant.*, art. "Pneumatici." See also Sprengel and Le Clerc.

³ Smith's *Dict. Ant.*, art. "Eclectici."

Amongst the most famous of the school were AGATHINUS OF SPARTA (1st cent. A.D.), who founded the Episynthetic sect, though Galen refers to him as among the Pneumatici. He was a pupil of Athenæus, and the tutor of Archigenes. None of his writings are extant. THEODORUS was a physician mentioned by Pliny.¹

ARCHIGENES OF APAMÆA, who practised in Rome (A.D. 98–117), was exceedingly famous. He is mentioned several times by Juvenal,² and was the most celebrated of the sect. He wrote on the pulse, and attempted the classification of fevers. Very few fragments of his works remain. He was the first to treat dysentery with opium.

ARETÆUS OF CAPPADOCIA (1st cent. A.D.) was a celebrated Greek physician who wrote on diseases, detailing their symptoms with great accuracy and displaying great skill in diagnosis. He was very little biased by any peculiar opinions, and his observations on diseases and their treatment have stood the light of our modern medical science better than those of many of the ancient authorities. He was acquainted with the fact that injuries to the brain cause paralysis on the opposite side; and his classification of mental diseases is as good as our own. His knowledge of anatomy was considerable, and in his physiology he shows how much more the ancients knew of this branch of science than is generally supposed. He was acquainted with the operation of tracheotomy, and remarked its partial success.³

He considered elephantiasis to be contagious, and gives this caution: "That it is not less dangerous to converse and live with persons affected with this distemper, than with those infected with the plague; because the contagion is communicated by the inspired air."⁴

HERODOTUS (there were several of the name) was a physician of repute in Rome (about A.D. 100). He was a pupil of Athenæus or Agathinus, and wrote several medical books which are quoted by Galen and Oribasius. He first recommended pomegranate root as a remedy for tapeworm, and described several infectious diseases.⁵

HELIODORUS (about A.D. 100) was a famous surgeon, and wrote on amputations and injuries of the head. His operation for scrotal hernia is described by Hæser as "a brilliant example of the surgical skill of the Empire." He treated stricture of the urethra by internal section.

CASSIUS FELIX lived in the first century after Christ, and was the author of a curious set of eighty-four medical questions and their answers. He was also called CASSIUS IATROSOPHISTA.

¹ *Nat. Hist.*, xx. 40; xxiv. 120.

² vi. 236; xiii. 98; xiv. 252.

³ See Baas, *Hist. Med.*, p. 167.

⁴ *De Causis Diuturnorum Morborum*, etc., lib. ii. cap. xiii.

⁵ Baas, *Hist. Med.*, p. 167.

LEONIDAS of Alexandria lived in the second or third century after Christ, was a distinguished surgeon, who operated on strumous glands, and amputated by the flap operation.

CLAUDIUS GALENUS, commonly called Galen, or, as mediæval writers named him, Gallien, was a very celebrated physician and philosopher, who was born at Pergamos in Asia, A.D. 131, under Hadrian. His father, Nicon, was an architect and geometrician, a highly cultivated and estimable man. His mother was a passionate scold, who led her husband a worse life than Xantippe led Socrates. Nicon spared no pains to give his son an education which should fit him to be a philosopher, and in his fifteenth year he was a pupil of the Stoic, Platonist, Peripatetic, and Epicurean philosophies. In his seventeenth year his father, in consequence of a dream, changed his intentions concerning his son's profession, and determined that he should study medicine. His first tutors were Æschrion, Satyrus, and Stratonicus. He studied the doctrines of all the sects of medicine in the school of Alexandria, and travelled in Egypt, Greece, Asia, and Italy. He devoted himself to none of the schools of medicine whose doctrines he had studied, but struck out a path for himself. On his return to Pergamos, he was selected to take charge of the wounded gladiators, a position which afforded him opportunities for studying surgical operations. He filled this post with great reputation and success. When he was thirty-four years old he went to Rome for the first time, remaining there four years, and acquiring a great reputation for his knowledge of anatomy, physiology, and medicine. He was connected with many persons of great influence, and his popularity at last became so great that it excited the ill-will of his professional brethren, especially as by his lecturing, writing, and disputing, his name was constantly before them. So great was the ill-feeling they bore towards him that he was afraid of being poisoned. He was called the "wonder speaker" and the "wonder worker."

"The greatest savant of all the ancient physicians," says Sprengel, "was Galen. He strove to introduce into medicine a severe dogmatism, and to give it a scientific appearance, borrowed almost entirely from the Peripatetic school. The enormous number of his works, the systematic order which distinguishes them, and the elegance of their style, won over, as by an irresistible charm, the indolent physicians who succeeded him, so that during many ages his system was considered as immovable." ¹

For thirteen centuries his name and influence dominated the medical profession in Europe, Asia, and Africa; and this influence, under the name of Galenism, was paramount in the eighteenth century, notwith-

¹ Sprengel, *Hist. de la Méd.*, Introd. vol. i. p. 15.

standing the discovery of the circulation of the blood and other great advances in science. Galen collected and co-ordinated all the medical knowledge which previous physicians and anatomists had acquired. He was no mere collector of, or compiler of other men's works ; but he enriched previous acquirements by his own observation, and was in every way a man greatly in advance of his time. "A great and profound spirit," says Daremberg, "he was philosopher as well as physician, realising the aspiration of Hippocrates when he said that the physician who should be also a philosopher must be the equal of the gods. A dialectician like Aristotle, a psychologist like Plato, who glorified his work by his genius for interpreting nature and life, his position as philosopher would have been beside those men, if his devotion to medicine had not called him to another sphere of intellectual activity." Nevertheless, Galen did in fact occupy an exalted position in the history of philosophy, not only in the West, but amongst the Arabians. His encyclopædic knowledge, his spirit of observation, and his influence on the thought of the middle ages, compel a comparison with Aristotle. It was thus that the vast body of medical material collected by the various sects and schools was analysed by the penetrating genius of Galen, whose philosophical and scientific mind was able to extract the good and permanent from the worthless and ephemeral material, which encumbered the literature of the healing art. He fell under the domination of none of the schools, though in one sense he may be said to have leaned towards the Dogmatists, "for his method was to reduce all his knowledge, as acquired by the observation of facts, to general theoretical principles."¹ He endeavoured to draw the student of medicine back to Hippocrates, of whom he was an admirer and expounder. The labours of Galen had the effect of destroying the vitality of the old medical sects ; they became merged in his system, and left off wrangling amongst themselves to imitate the new master who had arisen. A crowd of new writers found in the works of Galen abundant material for their industry.

Partly in consequence of this jealousy, and partly from the fact that in A.D. 167 a pestilence broke out in Rome, he left the city privately, and returned to his native country.

Galen, as a profound anatomist and physiologist, recognised final causes, a purpose in all parts of the bodies which he dissected ; and it is, as Whewell points out,² impossible for a really great anatomist to do other than recognise these. He cannot doubt that the nerves run along the limbs, *in order* that they may convey the impulses of the will

¹ Bostock, *Hist. of Med.*

² *Hist. Induct. Sciences*, vol. iii. p. 389.

to the muscles : he cannot doubt that the muscles are attached to the bones, *in order* that they move and support them.

The development of this conviction, that there is a purpose in the parts of animals of a function to which every organ is subservient, greatly contributed to the progress of physiology ; it compelled men to work till they had discovered what the purpose is. Galen declared that it is easy to say with some impotent pretenders that Nature has worked to no purpose. He has an enthusiastic scorn of the folly of atheism.¹ "Try," he says, "if you can imagine a shoe made with half the skill which appears in the skin of the foot." Somebody had expressed a desire for some structure of the human body over that which Nature has provided. "See," he exclaims, "what brutishness there is in this wish. But if I were to spend more words on such cattle, reasonable men might blame me for desecrating my work, which I regard as a religious hymn in honour of the Creator. True piety does not consist in immolating hecatombs, or in bearing a thousand delicious perfumes in His honour, but in recognising and loudly proclaiming His wisdom, almighty power, love and goodness. The Father of universal nature has proved His goodness in wisely providing for the happiness of all His creatures, in giving to each that which is most really useful for them. Let us celebrate Him then by our hymns and chants ! He has shown His infinite wisdom in choosing the best means for contriving His beneficent ends ; He has given proof of His omnipotence in creating everything perfectly conformable to its destination."

Anatomy must have reached a high standard before Galen's time, as we learn from his corrections of the mistakes and defects of his predecessors. He remarks that some anatomists have made one muscle into two, from its having two heads ; that they have overlooked some of the muscles in the face of an ape in consequence of not skinning the animal with their own hands. This shows that the anatomists before Galen's time had a tolerably complete knowledge of the science. But Galen greatly advanced it. He observes that the skeleton may be compared to the pole of a tent or the walls of a house. His knowledge of the action of the muscles was anatomically and mechanically correct. His discoveries and descriptions even of the very minute parts of the muscular system are highly praised by modern anatomists.²

He knew the necessity of the nerve supply to the muscle, and that the brain originated the consequent motion of a muscle so supplied, and proved the fact experimentally by cutting through some of the nerves and

¹ *De Usu*, Part iii. 10.

² Whewell, *Hist. Induct. Sciences*, vol. iii. p. 386. Sprengel, ii. p. 150.

so paralysing the part.¹ Where the origin of the nerve is, there, he said, it is admitted by all physicians and philosophers is the seat of the soul. This, he adds, is in the brain and not in the heart. The principles of voluntary motion were well understood, therefore, by Galen, and he must have possessed "clear mechanical views of what the tensions of collections of strings could do, and an exact practical acquaintance with the muscular cordage which exists in the animal frame :—in short, in this as in other instances of real advance in science, there must have been clear ideas and real facts, unity of thought and extent of observation, brought into contact."²

He observed that although a ligature on the inguinal or axillary artery causes the pulse to cease in the leg or in the arm, the operation is not permanently injurious, and that even the carotid arteries may be tied with impunity. He corrects the error of those who, in tying the carotids, omitted to separate the contiguous nerves, and then wrongly concluded that the consequent loss of voice was due to compression of the arteries.

Galen was the first and greatest authority on the pulse, if not our sole authority ; for all subsequent writers simply transferred his teaching on this subject bodily to their own works.³

Briefly it was as follows : "The pulse consists of four parts, of a diastole and a systole, with two intervals of rest, one after the diastole before the systole, the other after the systole before the diastole."⁴

His therapeutics were based on these two principles :—"1. That disease is something contrary to nature, and is to be overcome by that which is contrary to the disease itself ; and 2. That nature is to be preserved by that which has relation with nature."⁵

The affection contrary to nature must be overcome, and the strength of the body has to be preserved. But while the *cause* of the disease continues to operate, we must endeavour to remove it ; we are not to treat symptoms merely, for they will disappear when their cause is removed, and we must consider the constitution and condition of the patient before we proceed to treat him.

"Such as are essentially of a good constitution are such in whose bodies heat, coldness, dryness, and moisture are equally tempered ; the instruments of the body are composed in every part of due bigness, number, place, and formation."⁶ He gives in succeeding chapters the

¹ *De Motu Musc.*

² Whewell, *Hist. Induct. Sciences*, vol. iii. p. 388.

³ See for a full account of Galen's doctrine of the pulse, Dr. Adams' *Commentary on Paulus Ægineta*, vol. ii. p. 12.

⁴ *De Diagnosc. Puls.*, iii. 3, vol. viii. p. 902.

⁵ Dr. Greenhill in Smith's *Dict. Greek and Roman Biog.*

⁶ Galen's *Art of Physic.*

signs of a hot, cold, dry, moist, hot and dry, hot and moist, cold and dry, and cold and moist brain ; of a heart overheated, of a heart too cold, of a dry and of a moist heart, of a heart hot and dry, hot and moist, cold and moist, cold and dry heart. The liver is described under the same conditions.

Galen's surgery is not of very great importance, but he is credited with the resection of a portion of the sternum for caries and with ligature of the temporal artery.¹

He applied the doctrine of the four elements to his theories of diseases. "Fire is hot and dry ; air is hot and moist ; for the air is like a vapour ; water is cold and moist, and earth is cold and dry."

Galen's pathology is explained by Sprengel thus : when the body is free from pain, and performs its functions without obstacle, it is in a state of health ; when the functions are disturbed, there is a state of disease. The effect of disturbed functions is *the affection* (πάθος) ; that which determines this injury is the cause of the disease, the sensible effects of which are the symptoms.

Diseases (διάθεσις) are unnatural states either of the similar parts or of the organs themselves. Those of the similar parts proceed in general from the want of proportion among the elements, of which one or two predominate. In this manner arise eight different dyscrasies, or ill states of the constitution. Symptoms consist either in deranged function or vicious secretions. The internal causes of disease depend almost always on the superabundance or deterioration of the humours. Galen calls every disorder of the humours a putridity ; it is due to a stagnant humour being exposed to a high temperature without evaporating. Thus suppuration and the sediment of urine are proofs of putridity. In every fever there is a kind of putridity which gives out an unnatural heat, which becomes the cause of fever, because the heart and the arterial system take part in it.

Choulant enumerates eighty-three works of Galen which are acknowledged as genuine, nineteen which are doubtful, forty-five spurious, nineteen fragments ; and fifteen commentaries on different books of Hippocrates ; and more than fifty short pieces and fragments for the most part probably spurious, which are still lying unpublished in the libraries of Europe. Besides these Galen wrote many other works, the titles of which only remain to us ; so that it is estimated that altogether the number of his different books cannot have been less than five hundred.² He wrote, not on medicine only, but on ethics, logic, grammar, and other philosophical subjects ; he was therefore amongst

¹ *Ency. Brit.*, art. "Surgery."

² *Smith's Dict. Greek and Roman Biog.*, art. "Galen."

the greatest and most voluminous authors that have ever lived.¹ His style is elegant, but he is given to prolixity, and he abounds in quotations from the Greek writers.

PHILIP OF CÆSAREA was a contemporary of Galen about the middle of the second century after Christ. He belonged to the sect of the Empirici, and defended their doctrines. It is probable that he wrote on marasmus, on materia medica, and on catalepsy; but as there were other physicians of the same name, there is much uncertainty as to their identity.

After the death of Galen came the Gothic invasions over the civilized world, and all but extinguished the learning of the times. Medicine lingered still in Rome, Constantinople, and Alexandria, but individuals rather than schools and sects kept it alive; it struggled to exist amidst the grossest ignorance, superstition, and magical practices, till it was re-invigorated by the Saracens.

Saints COSMAS and DAMIAN (*circ.* 303) were brothers who studied the sciences in Syria, and became eminent for their skill in the practice of medicine. As they were Christians, and eager to spread the faith which they professed, they never took any fees, and thus came to be called by the Greeks *Anargyri* (without fees). The two brothers suffered martyrdom under the Diocletian persecution, and have ever since been famous as workers of miracles of healing and patrons of medical science. Their relics were everywhere honoured, and a church built in Rome by St. Gregory the Great preserves them to this day.

Dr. Meryon points out² that Gregory the Great enunciated one great doctrine of homœopathy: "Mos medicinæ est ut aliquando similia similibus, aliquando contraria contrariis curet. Nam sæpe calida calidis, frigida frigidis, sæpe autem frigida calidis, calida frigidis sanare consuevit."

ALEXANDER OF TRALLES, though one of the most eminent ancient physicians, believed in charms and amulets. Here are a few specimens. For a quotidian ague, "Gather an olive leaf before sunrise, write on it with common ink κα, ροι, α, and hang it round the neck" (xii. 7, p. 339); for the gout, "Write on a thin plate of gold, during the waning of the moon, μέι, θρεύ, μόρ, φόρ, τεύξ, βαίν, χωώκ" (xi. l. p. 313). He exorcised the gout thus: "I adjure thee by the great name 'Ιαὼ Σαβαώθ," that is, יהוה צבאות, and a little further on: "I adjure thee by the holy names 'Ιαὼ, Σαβαώθ, 'Αδωναϊ, 'Ελωϊ, that is יהוה צבאות, אדנאי, אלהי." ³

¹ Cardan, *De Subtil.*

² *Hist. of Med.*, vol. i. p. 115.

³ Smith's *Dict. Greek and Roman Biog.*, vol. i. p. 126.

Neoplatonism had its influence on medicine. Plotinus (A.D. 205-270), its great father, said, when dying, "I am striving to bring the God which is in us into harmony with the God which is in the Universe." The early Christians began to tell the world that the God within the soul of man and the God which is in the Universe are one and the same being, of absolute righteousness, power and love. Plotinus preached a gospel to the philosophic world; the first Christians preached theirs to every creature. Neoplatonism taught the world that spirit was meant to rule matter: it was not enough that the early Christian exhibited to mankind man transformed as the result of his intimate relationship to the Divine, the philosophic world demanded wonders, something above nature, as a proof of the Divine character of the revelation; then, as Kingsley explains,¹ we begin to enter "the fairy land of ecstasy, clairvoyance, insensibility to pain, cures produced by the effect of what we now call mesmerism. They are all there, these modern puzzles, in those old books of the long bygone seekers for wisdom." Thus mankind, for ever wandering in a circle, began by these ecstasies and cures to retrace its steps towards the ancient priestcraft. These wonders were nothing to the Egyptian, Babylonian, and Jewish sorcerers; they had traded in them for ages.

ANTYLLUS (*circa* 300 A.D.) is mentioned by Oribasius, and is said by Häser to have been one of the greatest of the world's surgeons; for aneurism he tied the artery above and below the sac, and evacuated its contents; for cataract, and for the cure of stammering, he invented appropriate treatment; and he employed something very much like tenotomy for contractures. He is the earliest writer whose directions are extant for performing the operation of tracheotomy. He must have been a man of great talent and originality. He practised the removal of glandular swellings of the neck and ligatured vessels before dividing them, giving directions for avoiding the carotid artery and the jugular vein. It is a striking proof of the high state which surgery had reached at this period that bones were resected with freedom; the long bones, the lower jaw, and the upper jaw were dealt with in a manner generally considered to be brilliant examples of modern surgery.

ORIBASIUS (A.D. 326-403) was born at Pergamos. By command of the Emperor Julian the Apostate he made a summary from the works of all preceding physicians who had written upon the Healing Art. Having made a collection of some seventy medical treatises, he reduced them into one, adding thereto the results of his own observations and experience. He also wrote for his friend Eunapius two books on diseases and their remedies, besides treatises on anatomy and

¹ *Alexandria and her Schools*, p. 113.

an epitome of the works of Galen.¹ He was called the Ape of Galen, and Freind says the title was not undeserved. He wrote in Greek, and though a mere compiler was capable of better things. His pharmacy was that of Dioscorides. He did some original work, as he was the first to write a description of the drum of the ear and the salivary glands. In his works also, we find the first description of the wonderful disease called lycanthropy, a form of melancholia, or insanity,² in which the affected persons believe themselves to be transformed into wolves, leaving their homes at night, imitating the behaviour of those animals, and wandering amongst the tombs. His great work he entitled *Collecta Medicinalia*. When Julian died, Oribasius fell into disgrace, and was banished. He bore his misfortunes with great fortitude, and so gained the esteem and love of the "barbarians" amongst whom he lived that he was almost adored as a god. He was ultimately restored to his property and honour.

JACOBUS PSYCHRISTUS lived in the time of Leo I. Thrax (A.D. 457-474), was a very famous physician of Constantinople, who was called "the Saviour," on account of his successful practice.

ADAMANTIUS OF ALEXANDRIA, an Iatrosophist, was a Jewish physician, who was expelled, with his co-religionists, from Alexandria, A.D. 415. He embraced Christianity at Constantinople. He wrote on physiognomy.

Iatrosophista was the ancient title of one who both taught and practised medicine.

Archiatr (chief physician) was a medical title under the Roman Empire, meaning "the chief of the physicians," and not "physician to the prince," as some have explained.³

MELETIUS (4th cent. A.D.), a Christian monk, wrote on physiology and anatomy.

NEMESIUS, Bishop of Emissa (near the end of the fourth century), wrote a treatise on the *Nature of Man*, which is remarkable for a proof that the good Churchman came very near to two discoveries which were made long after his time. He says that the object of the bile is to help digestion, to purify the blood, and impart heat to the body. Freind says ⁴ that in this we have the foundation of that which Sylvius de la Boë with so much vanity boasted he had invented himself. He adds that "if this theory be of any use in physic, Nemesius has a very good title to the discovery."

The Bishop described the circulation of the blood in very plain terms considering the state of physiology at that time.

"The motion of the pulse takes its rise from the heart, and chiefly

¹ Freind, *Historia Medicina*, p. 383.

² Smith's *Dict. Ant.*

³ *Ibid.*, p. 380.

⁴ *Hist. Med.*

from the left ventricle of it ; the artery is, with great vehemence, dilated and contracted by a sort of constant harmony and order. While it is dilated it draws the thinner part of the blood from the next veins, the exhalation or vapour of which blood is made the aliment for the vital spirit. But while it is contracted it exhales whatever fumes it has through the whole body and by secret passages. So that the heart throws out whatever is fuliginous through the mouth and the nose by expiration.”¹

LUCIUS wrote on pharmacy in the first century.

MARCELLUS EMPIRICUS (4th cent.) wrote a work on pharmacy, in Latin, which contains many charms and absurdities.

ÆTIUS was a Greek medical writer, who probably was a Christian of the sixth century. He was a native of Amida in Mesopotamia, and studied medicine at Alexandria. He wrote the *Sixteen Books on Medicine*, one of the most valuable medical treatises of antiquity ; though containing little original matter, it includes numerous extracts from works which have since perished.²

Many of the opinions of Ætius on surgery are excellent ; he recommended the seton, and lithotomy for women. Bleeding arteries he treated by twisting, as we do now, and by tying. He advised irrigation with cold water in the treatment of wounds. In lithotomy he recommends that the knife should be guarded by a tube. He treated worms with pomegranate bark, as has been recently revived.³ He was the first Greek medical writer amongst the Christians who gives specimens of the spells and charms so much used by the Egyptian Christians in surgical cases ; thus, in case of a bone sticking in the throat, the physician was to cry out in a loud voice, “ As Jesus Christ drew Lazarus from the grave, and Jonah out of the whale, thus Blasius, the martyr and servant of God, commands, ‘ Bone, come up or go down ! ’ ”⁴

INFLUENCE OF CHRISTIANITY.

At the time when the civilizations of Greece and Rome had reached their highest perfection, the poison of sensual indulgence, elevated into a religion, had instilled itself into the whole social life of the people : in every incident of life, in business, in pleasure, in literature, in politics, in arms, in the theatres, in the streets, in the baths, at the games, in the decorations of his home, in the ornaments and service of his table, in the very conditions of the weather and the physical phenomena of nature⁵ it met the Roman, and tainted every action of his life. Archdeacon Farrar, in the first chapter of his *Early Days of*

¹ Freind, *Hist. Med.*

² Baas, *Hist. Med.*, p. 201.

³ *North Brit. Rev.*, vol. 47.

⁴ *Ibid.*

⁵ *Ibid.*

Christianity, draws an awful picture of the corruption of the old world at the moment when it was confronted by Christianity. The parent had absolute power over the person of his child, and could destroy its life at its pleasure. Unfortunate children were exposed on the roadside or left to perish in the waters of the Tiber. The slave was the mere chattel of his master, and Roman women treated their servants with the utmost barbarity. Juvenal has painted for us in terrible colours the vices and shameless conduct of the women, and the selfish luxury and degrading pleasures of the men ; the nameless crime, which was the disgrace of Greek and Roman civilization, was looked upon as merely a question of taste ; and St. Paul, in the first chapter of the Epistle to the Romans, has recorded for all time what was the highest the most perfect civilization Paganism has ever produced was able to effect for the moral condition of the people. To the Roman and Greek world, saturated with the most perfect philosophy the world has ever known, and adorned by the art which has ever since been the despair of its imitators, there presented itself the Catholic Church, and before the sun's embrace sublime

“ Night wist
Her work done, and betook herself in mist
To marsh and hollow, there to bide her time
Blindly in acquiescence.” ¹

The enemies of Christianity have affected to lament the effects produced by the religion of Jesus on the art and science of the pagan world ; it has been said that the early Christians became so indifferent to the welfare of their bodies that they no longer sought medical aid when sick, but either resigned themselves to death or sought remedies in prayers. It is quite possible that, at the soul's awakening at the first revelation of the infinite importance of the spiritual life, men did somewhat neglect the ailments of the flesh and forget them in the effort to realize the things of the spirit. It is perfectly true that the natural sciences were not likely to make much progress in such a condition of things. But if Christians were careless of their own health, it is not less certain that they were intensely solicitous for that of their poor and friendless neighbours. The peculiar constitution of the Roman Empire, which was but a military tyranny, greatly contributed to its fall, and the collapse would have come earlier had it not been for Christianity. The Empire had very little cohesion ; the Church had a cohesive force, such as the world had never experienced before, and the Church availed herself of all the facilities which the Empire possessed of keeping up, from centre to circumference, the circulation of the spirit of solidarity

¹ Browning's *Parleyings*, p. 44.

which has ever animated the Catholic body. Of course there was little reason to expect the Church to be very favourably disposed towards the philosophies of old Greece and Rome; they had done little for the moral and social welfare of the people, and the Church had a better system than these could exhibit: but when St. Augustine appeared, there was found a *modus vivendi* between the noblest Platonism and the purest and loftiest Christian theology. He pointed the way towards a Christian science, and Europe ultimately realized it. It was found in the Schoolmen. Modern science is the legitimate child of Scholasticism, though it is unsparing in its abuse of its parent.

The slave to the ancient Roman was simply a beast who was able to speak. When such beasts became unprofitable, because through sickness or old age they could no longer work, they were frequently turned out to perish. Cato advised the agriculturists to sell their old and sick slaves when no longer able to work, just as he recommended them to dispose of worn-out and diseased cattle and worthless implements of husbandry.¹

The Emperor Claudius caused slaves who were thus cruelly treated to be proclaimed freemen. It was the merciful and charitable conduct of the early Christians towards slaves, of whom such vast numbers helped to people the Roman Empire, that caused the doctrines of the Gospel to spread so rapidly throughout the Roman world. The slave found in the Gospel of Christ the first system of religion and philosophy which took any account of the poor, the helpless, and the slave; the rich and cultured saw in the teachings of the Church of Christ the only system which embraced mankind as a whole. Juvenal² has indicated for us the value of a slave's life in these times.

“Go, crucify that slave. For what offence?
 Who the accuser? Where the evidence?
 For when the life of man is in debate,
 No time can be too long, no care too great.
 Hear all, weigh all with caution, I advise.
 ‘Thou sniveller! is a slave a man?’ she cries.
 ‘He’s innocent! be’t so; ’tis my command,
 My will; let that, sir, for a reason stand.”

Although there is evidence that hospitals for the reception and treatment of sick and destitute persons were established in India in very early times,³ and though we know that these were attached to

¹ Cato, *De re Rustica*, c. 2.

² Sat. vi.

³ Prescott says, *Conquest of Mexico*, chap. ii., that among the Aztecs, “Hospitals were established in the principal cities for the cure of the sick, and the permanent refuge of the disabled soldier; and the surgeons were placed over them, ‘who were so far better than those in Europe,’ says an old chronicler, ‘that they did not protract the cure, in order to increase the pay.’”

some of the temples of ancient Greece, and the Romans had convalescent institutions for sick slaves and soldiers, it cannot be doubted that we owe to Christianity the hospital as it exists amongst us at the present day.

Christianity taught the world not only that God is the Father of mankind, the pagan world already knew Him as Zeus pater, but that as His children we are the brethren and sisters of each other. The Church in Rome, in the third century, says Eusebius,¹ supported "widows and impotent persons, about a thousand and fifty souls who were all relieved through the grace and goodness of Almighty God." St. Basil the Great (A.D. 379) founded at Cæsarea a vast hospital, which Nazianzen calls a new city, and was named after him Basiliades. The same author thought "it might deservedly be reckoned among the miracles of the world, so numerous were the poor and sick that came thither, and so admirable was the care and order with which they were served."² In this institution St. Gregory of Nazianzus said, "disease became a school of wisdom, and misery was changed into happiness."

Chastel relates that (A.D. 375) Edessa possessed a hospital with 300 beds, and there were many similar institutions in the East. St. Jerome says that the widow Fabiola founded the first Christian infirmary in Rome, at the end of the fourth century. St. Paula, a Roman widow, in whose veins ran the blood of the Scipios, the Gracchi, and Paulus Æmilia, and of Agamemnon, was born in 347 A.D., and was one of the many noble Christian women who devoted their wealth and their lives to the poor, the suffering, and the helpless, in the early days of Christianity. She distributed immense alms, and built a hospital on the road to Jerusalem, and also a monastery for St. Jerome and his monks, whom she maintained, besides three monasteries for women;³ she carried the sick to their beds in her arms, and with her own hands washed their wounds, as St. Jerome tells us. In Italy, Gaul, and Spain, many asylums for sick and poor persons were built and maintained. Nor were their benefits confined to Christians; for Jews, slaves, and freemen were welcomed to these temples of charity. It is impossible in the limits of this work to trace fully the progress of the hospital movement; enough has been said to prove, as Baas, the Agnostic historian of medicine, admits,⁴ that "Hospitals proper, in our sense of the term, did not originate till Christian times."

When the plague raged at Alexandria, Eusebius tells us,⁵ "Many of

¹ *Ecclesiastical History*, lib. vi. ch. xlii.

² *Butler's Lives of the Saints*. St. Basil the Great.

³ *Ibid.*, loc. cit.

⁴ p. 153.

⁵ *Ecc. Hist.*, lib. vii. c. xxi.

our brethren, by reason of their great love and brotherly charity, sparing not themselves, cleaved one to another, visited the sick without weariness or heed-taking, and attended upon them diligently, cured them in Christ, which cost them their lives, and being full of other men's maladies, took the infection of their neighbours." Such was the initial impulse which Christian charity applied to the healing art; trace we now its splendid results in mediæval times.

In the Middle Ages almost all the monasteries and religious houses had a hospital of one kind or another attached to them; they had not only places of entertainment for pilgrims, but institutions for the treatment and care of the sick and poor. This care of the diseased and helpless was not left to the civil administration alone, but formed part of the regular work of the Church of the middle ages, and by ancient regulation this was placed under the control of the Bishops. The Council of Vienne ordained that if the administrators of a hospital, lay or clerical, became relaxed in the exercise of their charge, proceedings should be taken against them by the Bishops, who should reform and restore the hospital of their own authority.

The Council of Trent granted to Bishops the power of visiting the hospitals. This connection between the hospitals and the ecclesiastical power was acknowledged by the Christian sovereigns of Europe from the earliest times. The Emperor Justinian, for example, gave authority over the hospitals to the Bishops; the property of the hospitals was considered as Church property, and thus was protected in troublous times by the sanctity of religion.¹

The Council of Chalcedon placed such clergy as lived in establishments where orphans, the aged, and infirm were received and cared for under the authority of the Bishops, and makes use of the expression that this regulation was according to ancient custom.

In the time of the Council of Chalcedon a hospital (ξενοδοχεῖον) seems to have been a common adjunct of a church.² Originally appropriated to the reception of strangers, its use was afterwards extended to the relief of the poor and also of the sick, as at Alexandria, where, in A.D. 399, we read that "the priest Isidore being four-score years old, was at that time governor of the hospital."³

In connection with the story of Hypatia at Alexandria, we learn that the Parabolani was the name given to the clergy of the lowest order, who were appointed to attend to the sick, particularly in contagious disorders, from which circumstance, says Fleury,⁴ their name was derived, because it signifies persons who expose themselves.

¹ See Balmez, *European Civilization*, p. 436. ² Can. 10. Concil. iv. (Mans. vii.).

³ Fleury's *Eccl. Hist.*, Book xxi. 3, note c. ⁴ *Ibid.*, xxiii. 24.

MOSCHION DIORTHORTES (about the 6th cent.) was a specialist in diseases of women. He wrote a manual for midwives based on the work of Soranus. His description of the uterus is similar to the treatise of that physician. He refutes the opinion of the ancients on the situation of male infants on the right, and of females on the left. He has well indicated the signs of imminent abortion. He made a great number of observations on the physical education of children which must have been of great importance to his time. He justly explained the reason for the cessation of the catamenia after severe diseases: the system cannot afford the waste. He anticipated the modern discovery that sterility is a disease common to women and men. He adhered to the principles of the Methodical school, and the doctrines of *strictum* and *laxum*.¹

PAULUS ÆGINETA, one of the most famous of the Greek writers on medicine, was born in the island of Ægina, probably in the latter half of the seventh century after Christ. He was an Iatrosophist, and a Periodeutes, or one who travelled about in the exercise of his profession. He wrote several books on medicine, of which one has come down to us, called *De re Medica Libri Septem*, or "Synopsis of Medicine in seven books." Dr. Adams, in his translation of this famous work for the Sydenham Society, gives us the original introduction to the treatises of this physician, who informs us that:—

"In the first book you will find everything that relates to hygiene, and to the preservation from, and correction of, distempers peculiar to the various ages, seasons, temperaments, and so forth; also the powers and use of the different articles of food, as is set forth in the chapter of contents. In the second is explained the whole doctrine of fevers, an account of certain matters relating to them being premised, such as excrementitious discharges, critical days, and other appearances, and concluding with certain symptoms which are the concomitants of fevers. The third book relates to topical affections, beginning from the crown of the head, and descending down to the nails of the feet. The fourth book treats of those complaints which are external and exposed to view, and are not limited to one part of the body, but affect various parts. Also, of intestinal worms and dracunculi. The fifth treats of the wounds and bites of venomous animals; also of the distemper called hydrophobia, and of persons bitten by dogs which are mad, and by those which are not mad; and also of persons bitten by men. Afterwards it treats of deleterious substances, and of the preservatives from them. In the sixth book is contained everything relating to surgery, both what relates to the fleshy parts, such as the extraction of

¹ Sprengel, *Hist. de la Méd.*, p. 56.

weapons, and to the bones, which comprehends fractures and dislocations. In the seventh is contained an account of the properties of all medicines, first of the simple, then of the compound, particularly of those which I have mentioned in the preceding six books, and more especially the greater, and as it were, celebrated preparations ; for I did not think it proper to treat of all these articles promiscuously, lest it should occasion confusion, but so that any person looking for one or more of the distinguished preparations might easily find it. Towards the end are certain things connected with the composition of medicines, and of those articles which may be substituted for one another, the whole concluding with an account of weights and measures."

The most valuable and interesting part of this work is the sixth book. The whole treatise is chiefly a compilation from the great physicians who preceded Paulus, but the sixth book contains some original matter.

This great Byzantine physician must have possessed considerable skill in surgery. His famous treatise on midwifery is now lost ; it procured for him amongst the Arabs the title of "the Obstetrician," and entitles him to be called the first of the teachers of the accoucheur's art. Celebrated equally in the Arabian and Western schools, he exercised an enormous influence in the development of the medical arts. Throughout the Middle Ages he maintained his great popularity, and his surgical teaching was the basis of that of Abulcasis, which afforded to Europe in the Middle Ages her best surgical knowledge. He was the first writer who took notice of the cathartic properties of rhubarb.¹

After the time of Paulus of Ægina the art of surgery slept for five hundred years ; imitators of the ancient masters and compilers of their works alone remained to prove that it was still alive, but no progress was made. The religious orders employed the best methods they knew for the relief of physical suffering, but naturally it was not their work to perfect the healing art. In the Middle Ages, when so much of the medical and surgical practice was in the hands of the monks, particularly of the Benedictine order, many abuses crept in ; and at last the practice of surgery by the clergy was forbidden in 1163 by the Council of Tours.

The office of royal physician in the Frankish court in the sixth century was not unattended with risk. When Austrigildis, wife of King Guntram, died of the pestilence in the year 580, she expressed in her last moments a pious desire that her doctors, Nicolaus and Donatus, should be put to death for not having saved her ; and her husband, feeling it incumbent upon him to carry out her wishes, had them duly executed.²

¹ *Ency. Brit.*, vol. i. p. 181.

² Puschmann's *Hist. Med. Educ.*, p. 189.

ANCIENT SURGICAL INSTRUMENTS.

Bramhilla, surgeon to Francis II. of Austria, said that surgical instruments were invented by Tubal Cain, because the Bible says he was "the instructor of every artificer in brass and iron."

The saw is a tool of great antiquity. Pliny attributes its invention to Dædalus, or to his nephew Perdix, who was also called Talos; he was supposed to have imitated it from the jaw of a serpent, with which he had been able to cut a piece of wood. The invention of forceps was attributed to Vulcan and the Cyclopes. When used for extracting teeth, the Greeks called them *ὀδοντάγγρα*; for extracting arrow-heads and other weapons from the wounded in battle, the particular form employed was called *ἀρδιοθήρα*.

In the collection of domestic objects discovered by M. Petrie in the Egyptian ruins of Kahun, flint saws close upon 5,000 years old may be seen.¹

Pincers and tweezers are made by the natives of Timor-laut from the bamboo; they are used for pulling out the hair from the face. The natives of the Darling River, New South Wales, use fine bone needles for boring through the septum of the nose.

The book on *Wounds of the Head* is admitted by the best critics to be a genuine work of Hippocrates. We find in that treatise that he used the trepan, as he speaks of a *σμικρὸν τρέπανον*, a *small trepan*. There must also have been a larger one, a *πρίων*, or *saw*, which had a *περίοδος*, or *circular* motion, and which was probably the trephine, and a *πρίων χαρακτός*, or *jagged saw*, which is held to be the *trepan*; and he gives instructions to the operator to withdraw the instrument frequently and cool both it and the bone with cold water, and to exercise all vigilance not to wound the living membrane.²

Splints were used by the Greeks for fractured limbs; they were called *νάρθηκας*. Cutting for the stone is spoken of in the *Ὀρκος*, which is attributed to Hippocrates. Celsus describes lithotrixy, or crushing the stone by the instrument invented by Ammonios the *λιθοτόμος*, i.e. lithotomist.

Asclepiades practised tracheotomy. Many surgical instruments have been discovered in Herculaneum and Pompeii. There is a speculum vaginæ with two branches and a travelling yoke for them driven by a screw, and a speculum ani opening by pressure on the handles; there is a forceps of curious construction for removing pieces of bone from the surface of the brain in cases of fracture of the skull. Mr. Cockayne says: ³—

¹ *Pharaohs, Fellahs, etc.*, Amelia B. Edwards, p. 243.

² Preface to *Saxon Leechdoms*, vol. i. p. xxi.

³ *Ibid.*, vol. i. p. xxiii.

"It has been specially considered by Prof. Benedetto Vulpes [1847], who thinks it may also have been intended to take up an artery. The Greeks, he observes, as appears by an inscription dug up near Athens, were able to tie an artery in order to stop hæmorrhage, and words implying so much are found in a treatise of Archigenes (A.D. 100), existing in MS. in the Laurentian library at Florence, '*the vessels carrying (blood) towards the incision must be tied or sewed up.*' Near the end of the sixteenth century a French surgeon was the first to recover the ligature of the artery, and the instrument he used was very similar to the forceps in the Museum at Naples."

A curious pair of forceps has also been found, without a parallel among modern surgical instruments; the blades have a half turn, and the grip is toothed and spoon-shaped when closed. By construction it is suited for introduction into some internal cavity, and for holding firm and fast some excrescence there. Professor Vulpes finds it well calculated for dealing with the excrescences which grow upon the Schneiderian membrane covering the nasal bones, or such as come on the periphery of the anus, or the orifice of the female urethra; especially such as having a large base cannot be tied.¹

There is further an instrument for tapping the dropsical, described by Celsus² and Paulus Ægineta. It was somewhat altered in the middle of the seventeenth century by Petit.

An instrument suited to carry off the dropsical humours by a little at a time on successive days, as Celsus and Paulus Ægineta recommended, has also been dug up. Rust and hard earth, which cannot safely be removed, have blocked up the canal of the relic, and rendered conclusions less certain.³

"The probe, '*specillum*,' *μύλη*, is reputed by Cicero to have been invented by the Arcadian Apollo, who also was the first to bind up a wound. Seven varieties are figured in the work of Professor Vulpes in one plate, with ends obtuse, spoon-shaped, flat and oval, flat and square, flat and divided. The catheter of the ancients is figured by the same writer. It was furnished with a bit of wood to be drawn out by a thread, to prevent the obstructive effects of capillary attraction, and to fetch the urine after it when withdrawn. It is of bronze, and elastic catheters seem to be of modern invention." There are, or were in 1847, eighty-nine specimens of pincers in the Naples Museum.

Hooks, hamuli, cauterising instruments, a spatula, a silver lancet, a small spoon for examining a small quantity of blood after venesection.

¹ Vulpes, *Illustrazione di tutti gli Strumenti chirurgici scavati in Ercolano e in Pompei*, Napoli, 1847.

² *Ibid.*

³ Vulpes, *ut supra*.

There are cupping vessels of a somewhat spherical shape, from which air was exhausted by burning a little tow. A fleam for bleeding horses just like that used at the present time, a bent lever of steel for raising the bones of the head in cases of depressed fracture. Professor Vulpes gives figures of eight steel or iron knives used for various surgical purposes, and of a small plate to be used as an actual cautery.

ANCIENT SURGICAL INSTRUMENTS.

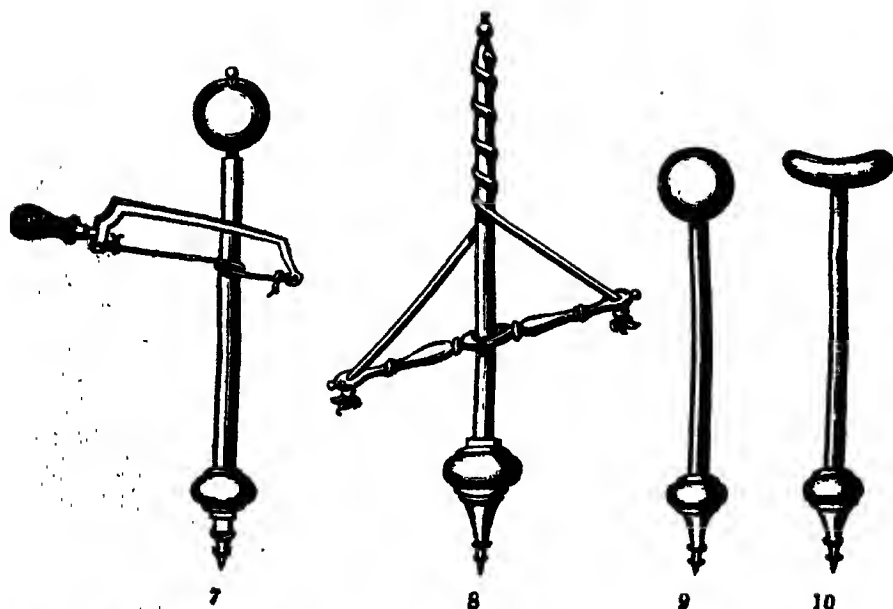
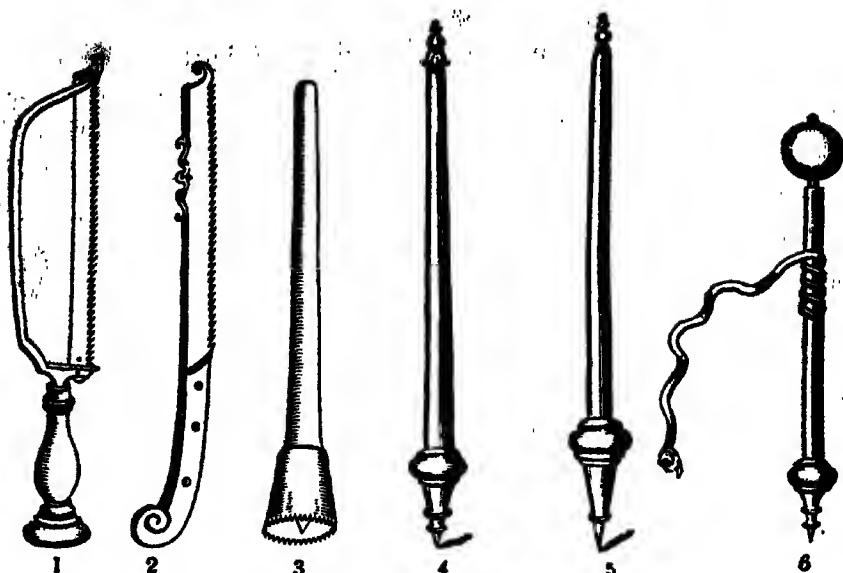


Fig. 1. The Saw used by Carpenters. Fig. 2. A Small Saw. Fig. 3. The Modiolus, or Ancient Trephine. Fig. 4. The Terebra, or Trepan, called Abaptiston. Fig. 5. The Augur used by Carpenters. Fig. 6. The Terebra, or Trepan, which is turned round by a thong bound tight about its middle. Fig. 7. The Augur, or Trepan, which is turned round by a bow. Fig. 8. A Terebra, or Trepan, which is turned round by a thong on a cross-beam. Fig. 9. A Terebra, or Trepan, which has a ball in its upper end, by which it is turned round. Fig. 10. A Terebra, or Trepan, which is turned round by a cross piece of wood, or handle, on its upper end. (From Adams' *Hippocrates*, vol. I.)

CHAPTER VI.

AMULETS AND CHARMS IN MEDICINE.

Universality of the Amulet.—Scarabs.—Beads.—Savage Amulets.—Gnostic and Christian Amulets.—Herbs and Animals as Charms.—Knots.—Precious Stones.—Signatures. — Numbers.—Saliva. — Talismans. — Scripts. — Characts. — Sacred Names.—Stolen Goods.

IN the ancient world, as with savages, the whole art of medicine was in many cases the art of preparing and applying amulets and charms.

An amulet (probably the word is denied from the Arabic *hamalet*, a pendant) is anything which is hung round the neck or attached to any other part of the body, and worn as an imagined protection against disease, witchcraft, accidents, or other evils. Stones, metals, bits of parchment, portions of the human body, as parings of the finger nails, may constitute these charms. Substances like stones, gems, or parchment may have certain words, letters, or signs inscribed upon them. In the East amulets have from the earliest ages been associated with the belief in evil spirits as the causes of diseases. A talisman may for our purpose be considered as the same thing as an amulet. In Scott's *Tales of the Crusaders*, there is one of these charms which has the power of stopping blood and protecting the wearer from hydrophobia. Charms, enchantments, the ceremonial use of words as incantations, songs, verses, etc., have all been used either with a view of causing, preventing, or curing diseases, and their use of course arose from the belief of primitive, or savage man his present representative, that our maladies have a supernatural origin. An amulet may consist merely of a piece of string tied like a bracelet round the wrist, as in India, where such a charm is commonly worn by school children; it is a talisman against fever, which has been blessed by a Brahman, has been sold for a half-rupee, and is highly esteemed by the wearer. Our word *carminative* (a comforting medicine, like tincture of cardamoms) means really a charm medicine, and is derived from the Latin *carmen*, a song-charm. This word enshrines the fact that magic and medicine were once united. The charm, *i.e.* song, was a spell, whether of words, philtres, or figures, as thus :—

“ With the charmes that she saide,
A fire down fro’ the sky alight.”

—Gower.

Charms, amulets, characts, talismans, and the like, are found amongst all peoples and in all times. They unite in one bond of superstitious brotherhood the savage and the philosopher, the Sumatrans and the Egyptians, the Malay and the Jew, the Catholic and the Protestant. The charm differs from the amulet merely in the fact that it need not be suspended. "There is scarcely a disease," says Pettigrew, "for which a charm has not been given."¹ And it is well to note that their greatest effect is always produced on disorders of the nervous system, in which the imagination plays so important a part. Charms are also used to avert diseases and other evils; so that the man, sufficiently protected as he supposes by these objects, not only will escape plague and pestilence, but will be invulnerable to bullet and sword. The Sumatrans practise medicine chiefly by charms; when called in to prescribe, they generally ask for "something on account," under the pretext of purchasing the appropriate charm.²

The hoof of the elk is used by the Indians and Norwegians and other northern nations as a cure for epilepsy. The patient must apply it to his heart, hold it in his left hand, and rub his ear with it.³

"Medicine" amongst primitive folk is a synonym for fetich; anything wonderful, mysterious, or unaccountable, is called "medicine" by the North American Indians. The medicine-bag is a mystery bag, a charm. In fetiches primitive man recognises something which has a power of a sort he cannot understand straightway; therefore it becomes to him a religious object. "Why are any herbs or roots magical?" asks Mr. Lang; and he correctly answers the question, not by any far-fetched explanations, but by the observation that herbs really do possess medicinal properties (some of them indeed of extreme potency), and the ignorant invariably confound medicine with magic.⁴ On this theory it is, of course, not necessary to swallow the medicine or apply it as we apply lotions and liniments; it is enough to carry it about as an amulet or charm, for it is the *life* of the thing which is efficacious, the *spirit*, which resides in the outward form, which possesses the virtue, not the material object itself. Of course, it may be necessary to take the charm internally; but then it is not the physiological action which is looked for, but the magical. Dapper, in his *Description of Africa* (p. 621), tells of savages who wear roots round their necks as amulets when they sleep out; they chew the roots, and spit the juice round the camp to keep off the wild beasts. At other times they burn the roots, and blow the smoke about for the same purpose. The Korannas carry roots as charms against bullets and wild animals. If successful in war, and obtaining

¹ *Medical Superstitions*, p. 56.

² Marsden, *Hist. Sumatra*, p. 189.

³ Pettigrew, *Medical Superstitions*, p. 61.

⁴ *Custom and Myth*, p. 148.

much booty, they say, "We thank thee, our grandfather's root, that thou hast given us cattle to eat."

The Bongoes and Niam-Niams have similar customs.¹

General Forlong, referring to the serpent Buddhism of Kambodia, says, that "Fetish worship was the first worship, and to a great extent is still the *real* faith of the great mass of the ignorant, especially about these parts."² "Probably one-quarter of the world yet deifies, or at least reverences, sticks and stones, ram-horns and charms."³

The Abyssinians are sunk in the grossest superstition; their medical practice is, to a large extent, based on the use of amulets and charms. Even leprosy and syphilis are treated by these means, and eye diseases by spitting in the affected organs.⁴

"Fetiches" are claws, fangs, roots, or stones, which the Africans believe to be inhabited by spirits, and so powerful for good or evil. The word is derived from the Portuguese *feitico*, a charm or amulet.

The Tibetans wear amulets upon their necks and arms; they contain nail-parings, teeth, or other reliques of some sainted Lama, with musk, written prayers, and other charms.⁵

Barth, travelling in Africa, found an English letter which had not reached its destination, used as a charm by a native.⁶

Leaving primitive folk and savage peoples, and turning to the great civilized nations of the past, we find the Egyptians, the Chaldæans, Assyrians, and Babylonians not less addicted to the use of amulets, charms, talismans, and philters than their untutored progenitors (assuming with the anthropologists that the savage of to-day represents the primitive people who must have preceded the founders of civilization). The Magi, according to Pliny,⁷ prescribed the herb feverfew, the *Pyrethrum parthenium*, to be pulled from the ground with the left hand, that the fevered patient's name must be spoken forth, and that the herborist must not look behind him. He tells us also that the Magi and the Pythagoreans ordered the *pseudo-anchusa* to be gathered with the left hand, while the plucker uttered the name of the person to be cured, and that it should be tied on him for the tertian fever.⁸

Of the *aglaophotis*, by which some commentators understand the peony (*Pæonia officinalis*), and others the "Moly" of Homer, Pliny says, "by means of this plant, the Magi can summon the deities into their presence when they please." Concerning the *achæmenis*, he says the root

¹ *Custom and Myth.*, p. 150.

² *Rivers of Life*, J. G. R. Forlong.

³ *Anthropological Journal*, vol. xii. p. 572.

⁴ Baas, *Hist. Med.*, p. 68.

⁵ Hooker, *Himalayan Journ.*, Ed. 1891, p. 141.

⁶ *Travels in Africa*, Ed. 1890, p. 488.

⁷ Plin., xxi. 104.

⁸ Plin., xxii. 24.

of it, according to the Magian belief as expressed by Democritus, when taken in wine, torments the guilty to such a degree during the night, by the various forms of avenging deities, as to extort from them a confession of their crimes. He tells, amongst other marvels, of the adamantis, a plant found in Armenia, which, when, presented to a lion, will make the beast fall upon its back and drop its jaws. The Magi said if any one swallowed the heart of a mole palpitating and fresh, he would at once become an expert diviner. An owl's heart placed on a woman's left breast while she is asleep will make her tell all her secrets. For quartan fevers they recommended a kind of beetle taken up with the left hand to be worn as an amulet.¹ The use of scarabs or beetles made of steatite, lapis-lazuli, cornelian, etc., as amulets, dates from the most ancient periods of Egyptian history. In the fourth Egyptian room of the British Museum there are specimens of scarabs, with the names of kings and queens dating B.C. 4400-250. The objects are not in all cases as old as the dates of the sovereigns whose names they bear. "The beetle was an emblem of the god Khepera, the self-created, and the origin and source from whence sprang gods and men. Rā, the Sun-god, who rose again daily, was, according to an Egyptian myth, a form of Khepera; and the burial of scarabs with mummies probably had reference to the resurrection of the dead."²

Some large scarabs which were fastened on the breasts of mummies had inscriptions from the 30th chapter of the *Book of the Dead*. The deceased person prays: "Let there be no obstruction to me in evidence; let there be no obstacle on the part of the Powers; let there be no repulse in the presence of the Guardian of the Scale." Other amulets consist of papyrus sceptres, buckles of Isis, hearts, fingers, etc., in gold and precious stones. They are laid between the bandages of mummies to guard the dead from evil.

Professor Lenormant explains the magical incantations which were used in connection with these talismans; they had to be "pronounced over the beetle of hard stone, which is to be overlaid with gold and to take the place of the individual's heart. Make a phylactery of it anointed with oil, and say magically over this object, 'My heart is my mother; my heart is in my transformations.'"³

The ancient Egyptians were buried with their amulets as a protection against the evil powers of the other world. Mr. Flinders Petrie, excavating at the Pyramid of Hawara, discovered on the body of Horuta a great number of these charms. He says: "Bit by bit the layers of pitch and cloth were loosened, and row after row of magnificent

¹ Plin., xxx. 30.

² *Official Guide, Brit. Museum Galleries, 1892, pp. 122-3.*

³ From *Ritual of the Dead*. Lenormant, *Chaldean Magic*, p. 90.

amulets were disclosed, just as they were laid on in the distant past. The gold ring on the finger which bore his name and titles, the exquisitely inlaid gold birds, the chased gold figures, the lazuli statuettes, delicately wrought, the polished lazuli and beryl, and carnelian amulets finely engraved, all the wealth of talismanic armoury, rewarded our eyes with a sight which has never been surpassed to archæological gaze. No such complete and rich a series of amulets has been seen intact before."¹

Anodyne necklaces, made of beads from peony roots, are worn by children in some parts to assist them in teething. The ancient Greeks held the peony in great repute; they believed it to be of divine origin, and it was for many centuries held to have the power to drive away evil spirits.²

Abydemis, a Greek historian who wrote a history of Assyria, says that the inhabitants made amulets from the wood of the ash, and hung them round their necks as a charm against sorcery.

In the Sanskrit Atharvaveda are found charms for diseases, which are influenced by colours. Saffron and the yellow-hammer are prescribed for jaundice; red remedies, and especially red cows, for blood diseases.

The extremity of the intestine of the ossifrage, says Pliny, if worn as an amulet, is well known to be an excellent remedy for colic. Another cure is for the patient to drink the water in which he has washed his feet!³ A tick from a dog's left ear, worn as an amulet, will allay all kinds of pains, but we must be careful to take it from a dog that is black.⁴

"Pliny says that any plant gathered from the bank of a brook or river before sunrise, provided that no one sees the person who gathers it, is considered as a remedy for tertian ague, when tied to the left arm, the patient not knowing what it is; also, that a person may be immediately cured of the headache by the application of any plant which has grown on the head of a statue, provided it be folded in the shred of a garment, and tied to the part affected with a red string."⁵

The cyclamen was cultivated in houses as a protection against poison. Pliny remarks that it was an amulet.⁶ Vivisection was practised in connection with charms. "If a man have a white spot, as cataract, in his eye, catch a fox alive, cut his tongue out, let him go, dry his tongue and tie it up in a red rag and hang it round the man's neck."

Alexander Trallianus was not able to rise above the absurdities of

¹ *Ten Years' Digging in Egypt*, p. 94.

² *Pratt's Flowering Plants*, vol. i. p. 50.

³ *Nat. Hist.*, Book xxx. chap. 20.

⁴ *Ibid.*, Book. xxx. chap. 24.

⁵ *Dict. Greek and Roman Ant.*, Smith's art. "Amulets."

⁶ *H. N.* xxv. 9.

the amulet. He recommends bits of old sailcloth from a shipwrecked vessel to be tied to the right arm and worn for seven weeks as a protection against epilepsy. He advises the heart of a lark to be fastened to the left thigh as a remedy for colic; for a quartan ague, the patient must carry about some hairs from a goat's chin. He admits that he has no faith in such things, but merely orders them as placebos for rich and fastidious patients who could not be persuaded to adopt a more rational treatment.¹

Dr. Baas tells us that "a regular pagan amulet was found in 1749 on the breast of the prince bishop Anselm Franz of Würzburg, count of Ingolstadt, after his death."²

GNOSTIC AND CHRISTIAN AMULETS.

Gnosticism is responsible for the introduction of many wonder-working amulets and charms. This system of philosophy was a fantastical combination of Orientalism, Greek philosophy, and Christianity. The teaching was that all natures were emanations of the Deity, or *Æons*. On some of the gnostic amulets the word *Mythras* was inscribed, on others *Serapis*, *Iao*, *Sabaoth*, *Adonai*, etc.

Notwithstanding the fact that the spirit of Christianity in its early days was strenuously opposed to all magical and superstitious practices, the nations it subdued to the faith of Christ were so wedded to their ancient practices that they could not be entirely divorced from them, and thus in the case of amulets and charms it was necessary to substitute Christian words and emblems in place of the heathen words and symbols previously in use.

Anglo-Saxon charms and amulets were used by the monks of Glastonbury Abbey, who treated disease. In the "Leech book"³ we find a holy amulet "against every evil rune lay,⁴ and one full of elvish tricks, writ for the bewitched man, this writing in Greek letters: Alfa, Omega, IESVM, BERONIKH. Again, another dust and drink against a rune lay; take a bramble apple,⁵ and lupins, and pulegium, pound them, then sift them, put them in a pouch, lay them under the altar, sing nine masses over them, put the dust into milk, drip thrice some holy water upon them, administer *this* to drink at three hours. . . . If a mare⁶ or hag ride a man, take lupins, and garlic, and betony, and frankincense, bind them on a fawn skin, let a man have the worts on him, and let him go into his house." For typhus fever the patient is to drink of a decoc-

¹ Smith's *Diet. Greek and Roman Ant.*, art. "Therapeutica." See also "Amulets," p. 45.

² *Hist. Med.*, p. 772.

³ Vol. ii. p. 139.

⁴ Heathen charm.

⁵ A blackberry.

⁶ Nightmare was considered to be the work of an evil spirit.

tion of herbs over which many masses have been sung, then say the names of the four gossellers and a charm and a prayer. Again, a man is to write in silence a charm, and silently put the words in his left breast and take care not to go indoors with the writing upon him, the words being EMMANUEL, VERONICA.

Mr. Cockayne, the editor of *Saxon Leechdoms*, has pointed out that the greatest scientific men of antiquity, even those who set themselves against the prevailing medical superstitions of their times, and did their utmost to establish observation and experiment in opposition to speculation and old wives' fables, were by no means liberated from a belief in magic and incantations. Chrysippus believed in amulets for quartan fevers.¹ Serapion, one of the chiefs of the Empiric school, prescribed crocodile's dung and turtle's blood in epilepsy. Soranos will not use incantations in the cure of diseases, yet he testifies that they were so employed. Pliny has an amulet for almost every disorder. He tells of a chief man in Spain who was cured of a disease by hanging purslane root round his neck; he teaches that an amulet of the seed of tribulus cures varicose veins; that the longest tooth of a black dog cures quartan fevers; or you may carry a wasp in your left hand or half a dozen other equally absurd things for the same purpose. A holly planted in the courtyard of a house keeps off witchcrafts; an herb picked from the head of a statue and tied with a red thread will cure headache, and so on.²

Josephus tells a tale which was probably the foundation of what was afterwards told about the mandrake. Xenocrates had a fancy for advising people to eat human brains, flesh or liver, or to swallow for various complaints the ground bones of parts of the human frame. Alexander of Tralles says that even Galen did homage to incantations.³ He gives his words: "Some think that incantations are like old wives' tales; as I did for a long while. But at last I was convinced that there is virtue in them by plain proofs before my eyes. For I had trial of their beneficial operations in the case of those scorpion-stung, nor less in the case of bones stuck fast in the throat, immediately, by an incantation thrown up. And many of them are excellent, severally, and they reach their mark." Yet Galen is angry with Pamphilos for "his babbling incantations," which were "not merely useless, not merely unprofessional, but all false: no good even to little boys, not to say students of medicine."⁴

¹ Plin., xxx. 30.

² See the twenty-second and twenty-fourth books of *Pliny's Natural History*.

³ Lib. ix. cap. 4, p. 538, Ed. 1556.

⁴ *Galen de Facult. Simpl.*, lib. vi. p. 792, Ed. Kuhn.

Alexander of Tralles frequently prescribes amulets and the like. Mr. Cockayne calls them periapts. "Thus for colic, he guarantees by his own experience, and the approval of almost all the best doctors, dung of a wolf, with bits of bone in it if possible, shut up in a pipe, and worn during the paroxysm, on the right arm, or thigh, or hip, taking care it touches neither the earth nor a bath. A lark eaten is good. The Thracians pick out its heart, while alive, and make a periapt, wearing it on the left thigh. A part of the cæcum of a pig prepared with myrrh, and put in a wolf's or dog's skin, is a good thing to wear. A ring with Hercules strangling a lion on the Median stone¹ is good to wear.

"A bit of a child's navel, shut up in something of gold or silver with salt, is a periapt which will make the patient at ease entirely. Have the setting of an iron ring octagonal, and engrave upon it, 'Flee, Flee, Ho, Ho, Bile, the lark was searching'; on the head of the ring have an N² engraved; this is potent, and he thinks it must be strange not to communicate so powerful an antidote, but begs it may be reserved from carnal folk, and told only to such as can keep secrets and are trusty. For the gout he recommends a certain cloth—*ἐκ τῶν καταμνηνίων*; also the sinews of a vulture's leg and toes tied on, minding that the right goes to the right, the left to the left; also the astragali of a hare, leaving the poor creature alive; also the skin of a seal for soles; also a line of Homer, *τερπῆχει δ' ἀγορή, ὑπὸ δὲ στροναχίζετο γαῖα*, on gold-leaf, when the moon is in Libra; also a natural magnet found when the moon is in Leo. Write on gold-leaf, in the wane of the moon, 'mei, threu, mor, for, teux, za, zon, the, lou, chri, ge, ze, ou, as the sun is consolidated in these names, and is renewed every day; so consolidate this plaster as it was before, now, now, quick, quick, for, behold, I pronounce the great name, in which are consolidated things in repose, iaz, azuf, zuon, threux, bain, chook; consolidate this plaster as it was at first, now, now, quick, quick.'³

"Then bits were to be chopped off a chameleon, and the creature living was to be wrapped up in a clean linen rag, and buried towards the sunrise, while the chopped bits were to be worn in tubes; all to be done when the moon was in the wane. Then again for gout, some henbane, when the moon is in Aquarius or Pisces, before sunset, must be dug up with the thumb and third finger of the left hand, and must be said, I declare, I declare, holy wort, to thee; I invite thee to-morrow to the house of Fileas, to stop the rheum of the feet of M. or N., and say I

¹ "A Gnostic device. See Montfaucon, plates 159, 161, 163."

² This also is Gnostic.

³ Mr. Cockayne considers this to be probably Gnostic; some of the words are pure nonsense.

invoke thee, the great name, Jehovah, Sabaoth, the God who steadied the earth and stayed the sea, the filler of flowing rivers, who dried up Lot's wife and made her a pillar of salt, take the breath of thy mother earth and her power, and dry the rheum of the feet or hands of M. or N. The next day, before sunrise, take a bone of some dead animal, and dig the root up with this bone, and say, I invoke thee by the holy names, Iao, Sabaoth, Adonai, Elai ; and put on the root one handful of salt, saying, ' As this salt will not increase, so may not the disorder of N. or M.' And hang the end of the root as a periapt on the sufferer," etc.¹

Although Alexander of Tralles was an enlightened and skillful physician, he recommended for epilepsy a metal cross tied to the arm ; and went to the Magi for assistance in his art, and was recommended to use jasper and coral with root of *nux vomica* tied in a linen cloth as an amulet. It seems strange that, although Hippocrates and the scepticism of the Epicureans had apparently destroyed the faith in magicians amongst the learned, that men should have so soon reverted to the absurdities from which they had been delivered ; but there is an element in our nature which can only be satisfied by that which magic represents, and even in the present age of science we have reverted to the same things under the names of Spiritualism, Theosophy, and Occultism.

It would be grossly unfair to the Catholic Church to complain of the slavery in which it kept the minds of the ignorant barbarians whom it had converted from paganism to Christianity. When we read of medicine masses, of herbs and decoctions placed under the altar, of holy water mixed with drugs, and the sign of the cross made over the poultices and lotions prescribed, we are apt to say that the priests merely substituted one form of superstition for another, which was a little coarser. A little reflection will serve to dispel this idea. A belief in magic influence is, as we have abundantly shown, inseparable from the minds of primitive and savage man. It is as certain that a savage will worship his fetish, pray to his idol, and believe in disease-demons, and their expulsion by charms and talismans, as that he will tattoo or paint his body, stick feathers in his hair, and rings in his nose and ears ; it is part of the evolution of man on his way to civilization. To suddenly deprive a savage or barbarian of all his magic remedies, his amulets and charms, would be as foolish as it would be futile : foolish, because many amulets and charms are perfectly harmless, and help to quiet and soothe the patient's mind ; futile, because whatever the ecclesiastical prohibi-

¹ Quoted by Mr. Cockayne in his *Saxon Leechdoms*, vol. i., Preface, pp. xviii., xix., xx.

tion, the obnoxious ceremonies would certainly be practised in secret. It was therefore wiser for the Church to compromise the matter, to wink at innocent superstitions, and endeavour to substitute a religious idea such as the sign of the cross would imply, for the meaningless, if not idolatrous, ceremonies of a pagan religion. Let us never forget that the Church delivered the nations from "the tyranny and terror of the poisoner and the wizard."

HERBS, ANIMALS, ETC., AS AMULETS.

Burton, in his *Anatomy of Melancholy*, mentions several "amulets and things to be borne about" as remedies for head-melancholy, such as hypericon, or St. John's wort, gathered on a Friday in the hour of Jupiter, "borne or hung about the neck, it mightily helps this affection, and drives away all fantastical spirits." A sheep or kid's skin whom a wolf worried must not be worn about a man, because it is apt to cause palpitation of the heart, "not for any fear, but a secret virtue which amulets have." "Peony doth cure epilepsy, precious stones most diseases; a wolf's dung borne with one helps the colic; a spider an ague, etc. Being in the country," he says, "in the vacation time, not many years since, at Lindley, in Leicestershire, my father's home, I first observed this amulet of a spider in a nut-shell lapped in silk, etc., so applied for an ague by my mother; whom, although I knew to have excellent skill in chirurgery, sore eyes, aches, etc., and such experimental medicines, as all the country where she dwelt can witness, to have done many famous and good cures upon diverse poor folks that were otherwise destitute of help; yet among all other experiments, this, methought, was most absurd and ridiculous; I could see no warrant for it—*Quid aranea cum febre?* For what antipathy?—till at length rambling amongst authors (as I often do), I found this very medicine in Dioscorides, approved by Matthiolus, repeated by Alderovandus, *cap. de aranea, lib. de insectis*, and began to have a better opinion of it, and to give more credit to amulets, when I saw it in some parties answer to experience."¹

The common fumitory (*Fumaria capreolata*) is said to derive its name from *fumus*, smoke, "because the smoke of this plant was said by the ancient exorcists to have the power of expelling evil spirits."²

The elder had many singular virtues attributed to it; if a boy were beaten with an elder stick, it hindered his growth; but an elder on which the sun had never shined was an amulet against erysipelas.³

¹ *Anatomy of Melancholy*, Part 2, sec. 5.

² Rev. C. A. John's *Flowers of the Field*.

³ Brand's *Observations*, vol. ii. p. 67.

KNOTS AS CHARMS.

Marcellus, a medical writer, quoted by Mr. Cockayne in his preface to *Saxon Leechdoms*, vol. i. p. xxix., gives an example of knots as charms. "As soon as a man gets pain in his eyes, tie in unwrought flax as many knots as there are letters in his name, pronouncing them as you go, and tie it round his neck."

PRECIOUS STONES AS CHARMS.

The origin of the superstitious belief in the magic power of precious stones has always been traced to Chaldæa. Pliny¹ refers to a book on the subject which was written by Lachalios, of Babylon, and dedicated to Mithridates.

The Eagle stone (*Ætites*) is a natural concretion, a variety of argillaceous oxide of iron, often hollow within, with a loose kernel in the centre, found sometimes in an eagle's nest. This was a famous amulet, bringing love between a man and his wife; and if tied to the left arm or side of a pregnant woman it ensured that she should not be delivered before her time. Women in labour were supposed to be quickly delivered if they were girded with the skin which a snake casts off.²

The Bezoar stone had a great reputation in melancholic affections. Manardus says it removes sadness and makes him merry that useth it.³

"Of the stone which hight agate. It is said that it hath eight virtues. One is when there is thunder, it doth not scathe the man who hath this stone with him. Another virtue is, on whatsoever house it is, therein a fiend may not be. The third virtue is, that no venom may scathe the man who hath the stone with him. The fourth virtue is, that the man, who hath on him secretly the loathly fiend, if he taketh in liquid any portion of the shavings of this stone, then soon is exhibited manifestly in him, that which before lay secretly hid. The fifth virtue is, he who is afflicted with any disease, if he taketh the stone in liquid, it is soon well with him. The sixth virtue is, that sorcery hurteth not the man who has the stone with him. The seventh virtue is, that he who taketh the stone in drink, will have so much the smoother body. The eighth virtue of the stone is, that no bite of any kind of snake may scathe him who tasteth the stone in liquid."⁴

SIGNATURES.

Colours have always had a medical significance, from their connection with the doctrine of "signatures." White was cooling; red was hot. Red flowers were given in disorders of the blood; yellow in bile dis-

¹ *Hist. Nat.*, xxxvii. 10.

² Brand's *Observations*, etc., vol. ii. p. 63.

³ Burton's *Anatomy*, p. 454.

⁴ *Saxon Leech Book*, II. ch. lxvi.

turbance. The bed-hangings in small-pox and scarlet-fever cases were commonly of a red colour ; the unhappy patient's room was hung about with red drapery. He had to drink infusions of red berries, such as mulberries. Avicenna said that as red bodies move the blood everything of a red colour is good for blood disorders.

NUMBERS.

Magic numbers as charms were in use in Anglo-Saxon medicine. " If any thing to cause annoyance get into a man's eye, with five fingers of the same side as the eye, run the eye over and fumble at it, saying three times, ' tetunc resonco, bregan gresso,' and spit thrice. For the same, shut the vexed eye and say thrice, ' in mon deromarcos axatison,' and spit thrice ; this remedy is ' mirificum.' For the same, shut the other eye, touch gently the vexed eye with the ring finger and thumb, and say thrice, ' I buss the gorgon's mouth.' This charm repeated thrice nine times will draw a bone stuck in a man's throat. For hordeolum, which is a sore place in the eyelid of the shape of a barley-corn, take nine grains of barley and with each poke the sore, with every one saying the magic words, *κυρια κυρια κασσαρια σουρωφβι* ; then throw away the nine, and do the same with seven ; throw away the seven, and do the same with five, and so with three and one. For the same, take nine grains of barley and poke the sore, and at every poke say, ' *φεύγε, φεύγε κριθή σε διώκει, flee, flee, barley thee chaseth.*' For the same, touch the sore with the medicinal or ring finger, and say thrice, ' *vigaria gasaria.*' To shorten the matter, blood may be stanchd by the words, ' *sicycuma, cucuma, ucuma, cuma, uma, ma, a.*' Also by ' Stupid on a mountain went, stupid, stupid was ;' by *socnon socnon ; σοκσοκαμ συκιμα* ; by *ψα ψε ψη ψε ψη ψα ψε*. For toothache say, ' *Argidam margidam sturgidam* ;' also, spit in a frog's mouth, and request him to make off with the toothache. For a troublesome uvula catch a spider, say suitable words, and make a phylactery of it. For a quinsy lay hold of the throat with the thumb and the ring and middle fingers, cocking up the other two, and tell it to be gone."

Nine is the number consecrated by Buddhism, three is sacred among Brahminical and Christian people. Pythagoras held that the unit or monad is the principle and the end of all. One is a good principle. Two, or the dyad, is the origin of contrasts and separation, and is an evil principle. Three, or the triad, is the image of the attributes of God. Four, or the tetrad, is the most perfect of numbers and the root of all things. It is holy by nature. Five, or the pentad, is everything ; it stops the power of poisons, and is redoubted by evil spirits. Six is a fortunate number. Seven is powerful for good or evil, and is a sacred number.

Eight is the first cube, so is man four-square or perfect. Nine, as the multiple of three, is sacred. Ten, or the decad, is the measure of all it contains, all the numeric relations and harmonies.¹

Cornelius Agrippa wrote on the power of numbers, which he declares is asserted by nature herself; thus the herb called cinquefoil, or five-leaved grass, resists poison, and bans devils by virtue of the number five; one leaf of it taken in wine twice a day cures the quotidian, three the tertian, four the quartan fever. He believed that every seventh son born to parents who have not had daughters is able to cure the king's-evil by touch or word alone.²

GIRDLES.

Amongst the ancient Britons, says Meryon,³ when a birth was attended with difficulty or danger, girdles were put round the woman, which were made for the purpose, and which gave her immediate relief. Many families in the highlands of Scotland kept such girdles until quite recently. They were marked with cabalistic figures, and were applied with certain ceremonies, which came originally from the Druids.

SPITTLE.

Levinus Lemnius says of saliva: "Divers experiments show what power and quality there is in man's fasting spittle, when he hath neither eat nor drunk before the use of it; for it cures all tetter, itch, scabs, pushes, and creeping sores; and if venomous little beasts have fastened on any part of the body, as hornets, beetles, toads, spiders, and such like, that by their venom cause tumours and great pains and inflammations; do but rub the places with fasting spittle, and all those effects will be gone and dismissed."⁴

Sir Thomas Browne is not quite sure that fasting saliva really is poisonous to snakes and vipers.⁵

In *Saxon Leechdoms* a cure for the gout runs thus: "Before getting out of bed in the morning, spit on your hand, rub all your sinews, and say, 'Flee, gout, flee, etc.'"⁶

Spittle was anciently a charm against all kinds of fascination. Pliny says it averted witchcraft. Theocritus says,—

"Thrice on my breast I spit, to guard me safe
From fascinating charms."

¹ See *Curious Myths of Middle Ages*, S. B. Gould, Appendix C, p. 273.

² Morley's *Life of Corn. Agrippa*, vol. i. p. 165.

³ *History of Medicine*, p. 107.

⁴ *Secret Miracles of Nature*, Eng. trans. fol., Lond. 1658, p. 164.

⁵ *Vulgar Errors*.

⁶ *Saxon Leechdoms*, vol. i., Pref., p. xxxii.

Fishermen and costermongers often spit on the first money they take, for good luck.¹

TALISMANS.

Talismans, says Fosbrooke,² are of five classes. 1. The *Astronomical*, with celestial signs and intelligible characters. 2. The *Magical*, with extraordinary figures, superstitious words, and names of unknown angels. 3. The *Mixed*, of celestial signs and barbarous words, but not superstitions, or with names of angels. 4. The *Sigilla Planetarum*, composed of Hebrew numeral letters, used by astrologers and fortune tellers. 5. *Hebrew Names and Characters*. These were formed according to the cabalistic art. Pettigrew gives a Hebrew talisman,³ which runs thus: "It overflowed—he did cast darts—Shaddai is all sufficient—his hand is strong, and is the preserver of my life in all its variations."

SCRIPTS.

Sir John Lubbock says that "The use of writing as a medicine prevails largely in Africa, where the priests or wizards write a prayer on a piece of board, wash it off, and make the patient drink it. Caillie met with a man who had a great reputation for sanctity, and who made his living by writing prayers on a board, washing them off, and then selling the water, which was sprinkled over various objects and supposed to protect them."⁴

Mungo Park relates similar facts.⁵

Sir A. Lyall says that a similar practice exists in India, where, however, the native practitioner may sometimes be seen mixing croton oil in the ink with which he writes his charms. "In Africa," says Lubbock, "the prayers written as medicine or as amulets are generally taken from the Koran." It is admitted that they are no protection against firearms; but this does not the least weaken faith in them, because, as guns were not invented in Mahomet's time, he naturally provided no specific against them.⁶

Among the Kirghiz Atkinson says that the Mullas sell such amulets at the rate of a sheep for each scrap of written paper,⁷ and similar charms are in great request among the Turkomans⁸ and in Afghanistan.⁹

¹ Brand's *Popular Antiquities*, vol. iii. p. 139.

² *Encyclopædia of Antiquities*, vol. i. p. 336.

³ *Medical Superstitions*, p. 45.

⁴ Lubbock, *Origin of Civilization*, 5th Ed., p. 23.

⁵ *Park's Travels*, vol. i. p. 357.

⁶ *Astley's Voyages*, vol. ii. p. 35.

⁷ *Siberia*, p. 310.

⁸ Vamberg's *Travels in Central Asia*, p. 50.

⁹ Masson's *Travels in Belochistan*, etc., vol. i. pp. 74, 90, 312, vol. ii. pp. 127,

The very curious account of the trial of jealousy in Numbers vi. 11-31 may be studied in this connection as showing the extreme antiquity of the writing charm. In the case of the woman suspected of having committed adultery "the priest shall bring her near, and set her before the Lord : and the priest shall take holy water in an earthen vessel ; and of the dust that is in the floor of the tabernacle the priest shall take, and put it into the water : and the priest shall set the woman before the Lord, and uncover the woman's head, and put the offering of memorial in her hands, which is the jealousy offering : and the priest shall have in his hand the bitter water that causeth the curse : and the priest shall charge her by an oath, and say unto the woman, If no man have lain with thee, and if thou hast not gone aside to uncleanness with another instead of thy husband, be thou free from this bitter water that causeth the curse : but if thou hast gone aside to another instead of thy husband, and if thou be defiled, and some man have lain with thee beside thine husband : then the priest shall charge the woman with an oath of cursing, and the priest shall say unto the woman, The Lord make thee a curse and an oath among thy people, when the Lord doth make thy thigh to rot, and thy belly to swell ; and this water that causeth the curse shall go into thy bowels, to make thy belly to swell, and thy thigh to rot : and the woman shall say, Amen, amen. And the priest shall write these curses in a book, and he shall blot them out with the bitter water : and he shall cause the woman to drink the bitter water that causeth the curse : and the water that causeth the curse shall enter into her, and become bitter. Then the priest shall take the jealousy offering out of the woman's hand, and shall wave the offering before the Lord, and offer it upon the altar : and the priest shall take an handful of the offering, even the memorial thereof, and burn it upon the altar, and afterward shall cause the woman to drink the water. And when he hath made her to drink the water, then it shall come to pass, that, if she be defiled, and have done trespass against her husband, that the water that causeth the curse shall enter into her, and become bitter, and her belly shall swell, and her thigh shall rot : and the woman shall be a curse among her people. And if the woman be not defiled, but be clean ; then she shall be free, and shall conceive seed. This is the law of jealousies, when a wife goeth aside to another instead of her husband, and is defiled ; or when the spirit of jealousy cometh upon him, and he be jealous over his wife, and shall set the woman before the Lord, and the priest shall execute upon her all this law. Then shall the man be guiltless from iniquity, and this woman shall bear her iniquity."

This is quite evidently taken from the customs of African tribes.

As the Egyptians gave the Jews their knowledge of the medical arts, and as this knowledge was doubtless largely intermingled with African ideas, it is easy to see how the ordeal of the bitter curse-water found its way into the Mosaic ritual.

Of scripts as amulets we find that anything written in a character which nobody could read was worn as an amulet against disease or danger. Thus the Anglo-Saxon MS., known as the Vercelli MS., by some means found its way to a place near Milan, where no one could decipher it. When that discovery was made, the next step was to cut up its precious pages for amulets, and so many of its leaves have perished.

After the death of Pascal, the philosopher, a writing was found sewn into his doublet. This was a "profession of faith" which he wore as a sort of amulet or charm, and his servants believed that he always had it stitched into a new garment when he discarded the old one.¹

"Mais ce qui montre que ce n'est par un simple engagement tel qu'on en peut prendre avec soi-même, c'est la forme étrange que Pascal lui a donnée. Pour quiconque a vu les écrits de ce genre de la part d'hallucinés, le premier coup d'œil montre que l'écrit de Pascal appartient à cette catégorie. D'ailleurs, il porte l'énonciation manifeste d'une vision en ces termes : 'Depuis environ dix heures et demie du soir jusque environ minuit et demi, feu.' Ainsi, ce jour-là, le lundi 23 Novembre, 1654, pendant environ deux heures, Pascal eut la vision d'un feu qu'il prit pour une apparition surnaturelle, et sa conviction fut si forte qu'elle le détermina à entrer plus avant qu'il n'avait fait jusqu'alors dans les voies de la dévotion et du rigorisme janséniste."²

CHARACTS.

Of the species of charms known as characts we have many examples in the practice of Anglo-Saxon physicians. In the preface to the *Herbarium of Apuleius*, used at Glastonbury, Mr. Cockayne, the editor, gives the following from Marcellus, 380 A.D., to avoid inflamed eyes : "Write on a clean sheet of *ουβαικ*, and hang this round the patient's neck, with a thread from the loom." In a state of purity and chastity write on a clean sheet of paper *φυρφαραν*, and hang it round the man's neck ; it will stop the approach of inflammation. The following will stop inflammation coming on, written on a clean sheet of paper : *ρουβος, ρονειρας ρηελιος ως καντεφορα και παντες ηακοτει* ; it must be hung to the neck by a thread ; and if both the patient and operator are in a state of chastity, it will stop inveterate inflammation. Again, write on a

¹ *The Thoughts of Blaise Pascal*, Bell's Ed. 1890, p. 2.

² *L'Amulette de Pascal. Médecine et Médecins.* Par E. Littré. Paris, 1872.

thin plate of gold with a needle of copper, *ορνω ουρωδη*; do this on a Monday; observe chastity; it will long and much avail."

Characts are amulets in the form of inscriptions, and are to be found in all the old houses still existing in Edinburgh.¹ The name of God is one of the commonest characts.

Rabbi Hama gives a sacred seal with divine names written in Hebrew, which he declares will cure not only all kinds of diseases, but heal all griefs whatsoever. The seals are figured in Morley's *Life of Cornelius Agrippa*.²

When a charact or charm lost its original meaning, it came to bear that of something worn for its supposed efficacy in preserving the wearer from danger in mind or body, and now means a mere trinket to hang on a watch chain. One of the most famous of ancient charms was the name of the supreme deity of the Assyrians. This was the Abracadabra, which was supposed to have a magical efficacy as an antidote against ague, fever, flux, and toothache.³ It was written on parchment, and arranged as follows :—

A B R A C A D A B R A
 A B R A C A D A B R
 A B R A C A D A B
 A B R A C A D A
 A B R A C A D
 A B R A C A
 A B R A C
 A B R A
 A B R
 A B
 A

This was suspended round the neck by a linen thread. The word Abraxas, or Abrasax, was engraved on antique stones, and used as amulets or charms against disease. Sometimes mystical characters and figures were added, as the head of a fowl, the arms and bust of a man terminating in the body and tail of a serpent. It is of Egyptian origin, and is referred to by the Greek Fathers. The Egyptians used it to dispossess evil spirits and to cure diseases.⁴

Abraxas is the president of the 365th heaven, and is thus evidently a sun myth. Apollo is the sun in mythology, and he was the god of physic or healing.⁵

¹ Arnot's *Hist. Edin.*

² Vol. i. p. 192.

³ *Præcepta de Medicina* of Serenus Samonicus.

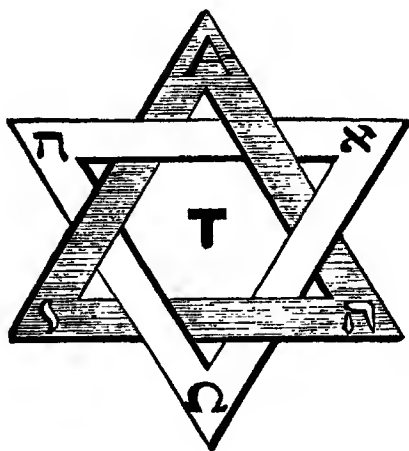
⁴ Lardner, *Works*, vol. ix. pp. 290–364.

⁵ Pettigrew, *Medical Superstitions*, p. 52.

Brande, in his *Popular Antiquities*, gives the following charm from a manuscript of the date of 1475 :¹—

“Here ys a charme for wyked Wych. In nomine Patris, et Filii, et Spiritus Sancti. Amen. Per Virtutem Domini sint Medicina mei pia Crux ☩ et passio Christi ☩. Vulnera quinque Domini sint Medicina mei ☩. Virgo Maria mihi succurre, et defende ab omni maligno Demonio, et ab omni maligno Spiritu. Amen. ☩ a ☩ g ☩ l ☩ a ☩ Tetragrammaton. ☩ Alpha, ☩ oo, ☩ primogenitus, ☩ vita, vita. ☩ Sapiencia, ☩ Virtus, ☩ Jesus Nazareus rex judeorum, ☩ fili Domini, miserere mei. Amen. ☩ Marcus ☩ Matheus ☩ Lucas ☩ Johannes mihi succurrite et defendite. Amen. ☩ Omnipotens sempiterne Deus, hunc N. famulum tuum hoc breve Scriptum super se portantem prospere salvet dormiendo, vigilando, potando, et precipue sompnando ab omni Maligno Demonio, eciam ab omni maligno spiritu ☩.”

One of the most famous charms of this kind is the “Solomon’s Seal.”



Amongst the Cabalists an amulet, with the names “Senoi, Sansenoi, Semongeloph,” upon it, was fastened round the neck of the new-born child.²

The first Psalm, when written on doeskin, was supposed to help the birth of children ; but the writer of such Psalm amulets, as soon as he had written one line, had to plunge into a bath. “Moreover,” says Mr. Morley, “that the charm might be the work of a pure man, before every new line of his manuscript it was thought necessary that he should repeat the plunge.”³

¹ Vol. iii. p. 29.

² Morley's *Life of Cornelius Agrippa*, vol. i. p. 80.

³ *Ibid.*, p. 81.

SACRED NAMES AS CHARMS.

Some of the Jews accounted for the miracles of healing wrought by our Saviour by declaring that He had learned the Mirific Word, the true pronounciation of the name Jehovah ; this word stirs all the angels and rules all creatures. They said that He had gained admission to the Holy of Holies, where He learned the sacred mystery, wrote it on a tablet, cut open His thigh, and having put the tablet in the wound, closed the flesh by uttering the mystic Name. The names of angels and evil spirits were also held to be potent by the Cabalists. The name of a bad angel, Schabriri, was used when written down as a charm to cure ophthalmia.

STOLEN PROPERTY AS A CHARM.

In Mr. Andrew Lang's delightful *Custom and Myth* he says that he once met at dinner a lady who carried a *stolen* potato about with her as a cure for rheumatism. The potato must be stolen, or the charm would not work.

A small piece of beef, if *stolen* from a butcher, is supposed by some persons to charm away warts.

BOOK IV.

CELTIC, TEUTONIC, AND MEDIÆVAL MEDICINE.

CHAPTER I.

MEDICINE OF THE DRUIDS, TEUTONS, ANGLO-SAXONS, AND WELSH.

Origin of the Druid Religion.—Druid Medicine.—Their Magic.—Teutonic Medicine.—Gods of Healing.—Elves.—The Elements.—Anglo-Saxon Leechcraft.—The Leech-book.—Monastic Leechdoms.—Superstitions.—Welsh Medicine.—The Triads.—Welsh Druidism.—The Laws of the Court Physicians.—Welsh Medical Maxims.—Welsh Medical and Surgical Practice and Fees.

MEDICINE OF THE DRUIDS.

THE learned men of the Celto-Britannic regions were called Druids. They were the judges, legislators, priests, and physicians, and corresponded to the Magi of the ancient Persians and Chaldæans of Syria. The etymology of the name is uncertain. The old derivation from *δρῦς*, an oak, is considered fanciful, and that from the Irish *draoi*, *druidh* = a magician, an augur, is by some authorities preferred. It is probable that they derived their knowledge from association with Greek colonists of Marseilles, as such writing as they used was in Greek characters, and they taught the doctrine of the immortality of the soul and a philosophy which Diodorus Siculus says was similar to that of the teaching of Pythagoras. Clement of Alexandria compared their religion to Shamanism. Whatever it was, it did not differ probably very widely from other systems which pretended to put its priests in direct communication with gods and demons. Its priests, says Sprengel, were simply impostors who pretended to exclusive knowledge of medicine and other sciences. Their women practised sorcery and divination, but by their medical skill were able to afford great assistance to the wounded in war. Plants were collected and magical properties ascribed to them. Lying-in women sought the aid of these Druidesses, who seem to have been wise women, somewhat after the character of gypsies. Mela says these women were called *Senæ*. They pretended to cure the most incurable diseases and to raise tempests by their incantations.¹ The Druids communicated their knowledge to initiates only, and they celebrated their mystic rites under groves of oaks. Whatever grew on that tree was considered a divine gift; their highest veneration was reserved for

¹ Henry's *Hist. of Great Britain*, vol. i. p. 147.

the mistletoe, which they called All-Heal, and which they considered a panacea for all diseases. Three other plants, called *Selago*, a kind of club-moss, or perhaps hedge-hyssop, *Samulus*, the brookweed or winter cress, and Vervain, were held to be sacred plants. The mistletoe must be gathered fasting, the gatherer must not look backward while doing it, and he must take it with his left hand. The branches and herbs were immersed in water, and the infusion then became possessed of the property of preserving the drinkers from disease. When the *Selago* and Vervain were gathered, a white garment was worn, sacrifices of bread and wine were offered, and the gatherer, having covered his hand with the skirt of his robe, cut up the herbs with a hook made of a metal more precious than iron, placed it in a clean cloth, and preserved it as a charm against misfortunes and accidents.¹

Strutt says: "Faint is the light thrown upon the methods pursued by the Druids in preparing their medicines. Some few hints, it is true, we meet with, of their extracting the juice of herbs, their bruising and steeping them in water, infusing them in wine, boiling them and making fumes from them, and the like; it also appears that they were not ignorant of making salves and ointments from vegetables."²

In Britain the magical juggles, ceremonies, and rites were carried to a greater excess than in any other Celtic nation. They made a great mystery of their learning, their seminaries were held in groves and forests and the caverns of the earth.³ Strutt thinks that their alphabet was derived from the Greek merchants, who came frequently to the island. Pliny says that the ancient Britons were much addicted to the arts of divination.⁴ Diodorus Siculus describes one of their methods. "They take a man who is to be sacrificed and kill him with one stroke of a sword above the diaphragm; and by observing the posture in which he falls, his different convulsions, and the direction in which the blood flows from his body, they form their predictions, according to certain rules which have been left them by their ancestors."⁵

Strutt says: "The people were the more particularly inclined to make application to them for relief, because they thought that all internal diseases proceeded from the anger of the gods, and therefore none could be so proper to make intercession for them as the priest of those very deities from whom their afflictions came; for this cause also

¹ Meryon, *Hist. Med.*, pp. 113, 114; Strutt's *Chronicles of England*, vol. i. p. 279.

² *Chronicles of England*, vol. i. p. 279.

³ *Ibid.*, p. 281.

⁴ Plin., *Hist. Nat.*, lib. xxx. c. i.

⁵ Diod. Sicul., lib. v. cap. 35.

⁶ *The Chronicles of England*, vol. i. pp. 278, 279.

they offered sacrifices when sick ; and if dangerously ill, the better to prevail upon the gods to restore them to health, a man was slain and sacrificed upon their altars." The custom of human sacrifices doubtless afforded the Druids some knowledge of human anatomy. Their surgery was of a simple but useful character, and had to do principally with setting broken bones, reducing dislocations, and healing wounds ; all this, of course, combined with magical ceremonies.¹

Pliny refers to the magical practices of the Druids, and states that the Emperor Tiberius put them down, "and all that tribe of wizards and physicians."² He adds that they crossed the ocean and "penetrated to the void recesses of Nature," as he calls Britannia. There, he tells us, they still cultivated the magic art, and that with fascinations and ceremonials so august that Persia might almost seem to have communicated it direct to Britain. "The worship of the stars, lakes, forests, and rivers, the ceremonials used in cutting the plants Samiolus, Selago, and Mistletoe, and the virtues attributed to the adder's egg," are thought by Ajasson to indicate the connection between the superstitions of ancient Britain and those of Persia.³

MEDICINE OF THE TEUTONS.

The Goths and other German peoples were from early times brought into relationship with the Romans, and had acquired some of the advantages of their civilization.

Originally their medical notions were not dissimilar to those of other barbaric nations. On the one hand, there was the belief in disease as the manifestation of the anger of supernatural beings who could be propitiated by prayers and magic rites ; while on the other, the use of medicinal plants and the ministrations of old women were not less prominent. Tacitus points out the important part played by the women in the life of the Germans, and the good influence they exerted as nurses to the sick.

The Roman general Agricola, who was in Britain from A.D. 78-84, induced the noblemen's sons to learn the liberal sciences.⁴ They must have acquired some knowledge of Greek and Roman medicine.

In the earliest ages, says Baas,⁵ women only seem to have practised

¹ *The Chronicles of England*, vol. i. p. 278.

² *Nat. Hist.*, Book xxx. chap. iv.

³ See note on Pliny's passage, "Ut dedisse Persis videri possit," in Bohn's *Pliny's Nat. Hist.*, vol. v. p. 426.

⁴ Holinshed, *Chronicles of England*, vol. i. p. 506.

⁵ *Hist. Med.*, p. 249.

medicine among the Germans and Celts. Medicine was deemed a profession unworthy of men, and it is not till the twelfth century that physicians are spoken of. Probably old women or Druidesses in ancient times were the only doctors of these peoples. Puschmann says that the Norwegians had a number of highly paid doctors in the tenth century, and that already a medical tax existed.¹

In the time of the Vikings wounds were well attended to, amputations performed, and wooden legs were not uncommon. "Mention," says Puschmann, "is also made of the operation called gastroraphy" (or sewing up a wound of the belly or some of its contents);² lithotomy was performed successfully.

Wodan is the all-pervading creative and formative power who gives shape and beauty, wealth, prosperity, and all highest blessings to men.³

Eir was the goddess of physicians; Odin was a doctor; Brunhilda was a doctress.

The ancient German nations offered to the gods sacrifices of human food, which they believed they enjoyed. These sacrifices were offered as thanksgivings or to appease their anger. When a famine or a pestilence appeared amongst the people, they concluded that the gods were angry, and they proceeded to propitiate them with gifts.⁴

Animal and especially human sacrifices had the most binding and atoning power.⁵

The Teutonic elves are good-natured, helpful beings. They fetch goodwives, midwives, to assist she-dwarfs in labour, and have much knowledge of occult healing virtues in plants and stones.⁶ But elves sometimes do mischief to men. Their touch and their breath may bring sickness or death on man and beast. Lamed cattle are said in Norway to be bewitched by them, and their avenging hand makes men silly or half-witted.⁷

Teutonic peoples have always had great faith in the normal influence of pure water.

The Germans believed in the magical properties of water hallowed at midnight of the day of baptism. Such water they called *heilawác*. They believed it to have a wonderful power of healing diseases and wounds, and of never spoiling.⁸ The salt which is added to holy water in the church will account for its keeping properties. But it is in medicinal springs, such as are called Heilbrunn, Heilborn, Heiligenbrunnen, that

¹ *Hist. Med. Education*, p. 187.

² *Ibid.*, p. 186.

³ Grimm's *Teutonic Mythology*, translated by Stallybrass, vol. i. p. 133.

⁴ *Ibid.*, vol. i. p. 42.

⁵ See Tennyson's poem, *The Victim*.

⁶ Grimm.

⁷ *Ibid.*

⁸ Grimm, *Teutonic Mythology*, vol. ii. p. 586.

Teutonic faith has always exhibited the strongest devotion. Sacrifices, says Grimm, were offered at such springs. When the Wetterau people begin a new jug of chalybeate water, they always spill a few drops first on the ground. Grimm thinks this was originally a libation to the fountain sprite.¹ The Christians replaced water-sprites by saints.

Fire was regularly worshipped, and there are many superstitions still existing which point to this phase of Teutonic religion. "The Esthonians throw gifts into fire, as well as into water. To pacify the flame they sacrifice a fowl to it."² Sulphur has always had an evil reputation. Murrain amongst cattle could only be got rid of by a Needfire. On the day appointed for banishing the pest, there must in no house be any flame left on the hearth, but a new fire must be kindled by friction after the manner of savages.³

Teutonic children born with a caul about their head are believed to be lucky children. The membrane is carefully treasured, and sometimes worn round the babe as an amulet. The Icelanders imagine that the child's guardian spirit resides in it; midwives are careful not to injure it, but bury it under the threshold. If any one throws it away, he deprives the child of its guardian spirit.⁴

ANGLO-SAXON MEDICINE.

It is difficult to discover what was the state of learning existing amongst the ancient Saxons before their conversion to Christianity. We know that soon after this event schools were established in Kent, with such good results that Sigebert (A.D. 635) established seminaries on the same plan in his own dominions. After this, as Bede informs us, there flourished a great number of learned men.⁵

Theodore, Archbishop of Canterbury, came over into Britain A.D. 669, and did much to improve the learning of the country. He was accompanied by many professors of science, one of whom, the monk Adrian, instructed a great number of students in the sciences, especially teaching the art of medicine and establishing rules for preserving the health.⁶ Aldhelm, who according to Bede was a man of great erudition and was "wonderfully well acquainted with books," very greatly contributed to the spread of education.

The state of medicine in England in Anglo-Saxon times is said by

¹ Grimm's *Teutonic Mythology*, p. 588.

² *Ibid.*, p. 604.

³ *Ecc. Hist.*, lib. iii. cap. 18.

⁴ Strutt's *Chronicles of England*, vol. i. p. 345.

⁵ *Ibid.*, p. 602.

⁶ *Ibid.*, vol. ii. p. 874.

Strutt¹ to have been very degraded. Medicine consisted chiefly of nostrums which had been handed down from one age to another, and their administration was usually accompanied with whimsical rites and ceremonies, to which the success was often in a great measure attributed. The most ignorant persons practised the profession, and particularly old women, who were supposed to be the most expert and were in high repute amongst the Anglo-Saxons. After the establishment of Christianity the clergy succeeded to the business carried on by the ancient dames, and it must be admitted that the superstitious element in their treatment of disease was not less prominent than in that of their venerable predecessors. Bede says² that Theodore, Archbishop of Canterbury, taught that "It is very dangerous to let blood on the fourth day of the moon, because both the light of the moon and the tides are upon the increase." Before any medicine could be administered, fortunate and unfortunate times, the changes of the moon and appearance of the planets, had to be considered.

Many medicinal books were amongst those which Ælfred the Great caused to be translated into the Saxon tongue. Some of them were embellished with illustrations of herbs, etc., so that about the tenth century some knowledge of medicine was diffused, and Strutt thinks there may have been persons whose only profession was medicine and surgery, besides the ecclesiastics who practise³ these arts, before the close of the Saxon government.³

The Anglo-Saxons, even after their conversion to Christianity, retained much of the superstition of their ancestors; they placed faith in astrology, and had some acquaintance with astronomy, which they obtained from the Romans, from whom they learned most of the arts and sciences. They had a good knowledge of botany, and their MS. were embellished with excellent drawings of the herbs and plants.⁴

Theodore brought with him a large collection of books, and set up schools in Kent, where many students were instructed in the sciences and the knowledge and application of medicine and the rules for the preservation of the health.⁵

The Rev. Oswald Cockayne has given us, in his translation of the Saxon *Leech Book*, a very curious and interesting citation from Helias, Patriarch of Jerusalem, who wrote to King Ælfred in answer to his request to be furnished with some good recipes from the Holy Land:

¹ *Chronicles of England*, vol. ii. p. 248.

² Bede, *Eccles. Hist.*, lib. v. cap. 3.

³ *Chronicles of England*, vol. ii. p. 248.

⁴ Strutt's *Horda Angel Cynnian*, vol. i. p. 70.

⁵ Strutt, *The Chronicles of England*, vol. i. p. 344. Bede, *Eccles. Hist.*, iii. 18.

“ Patriarch Helias sends these to King Ælfred : ¹—

* * * * *

“ So much as may weigh a penny and a half, rub very small, then add the white of an egg, and give it to the man to sip. It (*balsam*) is also very good in this wise for cough and for carbuncle, apply this wort, soon shall the man be hole. This is smearing with balsam for all infirmities which are on a man’s body, against fever, and against apparitions, and against all delusions. Similarly also petroleum is good to drink simple for inward tenderness, and to smear on outwardly on a winter’s day, since it hath very much heat ; hence one shall drink it in winter ; and it is good if for any one his speech faileth, then let him take it, and make the mark of Christ under his tongue, and swallow a little of it. Also if a man become out of his wits, then let him take part of it, and make Christ’s mark on every limb, except the cross upon the forehead, that shall be of balsam, and the other *also* on the top of the head. Triacle (*θηριακόν*) is a good drink for all inward tenderesses, and the man, who so behaveth himself as is here said, he may much help himself. On the day on which he will drink *Triacle*, he shall fast until midday, and not let the wind blow on him that day : then let him go to the bath, let him sit there till he sweat ; then let him take a cup, and put a little warm water in it, then let him take a little bit of the triacle, and mingle with the water, and drain ~~th~~rough some thin raiment, then drink it, and let him then go to his bed and wrap himself up warm, and so lie till he sweat well ; then let him arise and sit up and clothe himself, and then take his meat at noon, and protect himself earnestly against the wind that day ; then, I believe to God, that it may help the man much. The white stone is powerful against stitch, and against flying venom, and against all strange calamities ; thou shalt shave it into water and drink a good mickle, and shave thereto a portion of the red earth, and the stones are all very good to drink of, against all strange uncouth things. When the fire is struck out of the stone, it is good against lightnings and against thunders, and against delusion of every kind ; and if a man in his way is gone astray, let him strike himself a spark before him. He will soon be in the right way. All this Dominus Helias, Patriarch at Jerusalem, ordered *one* to say to King Ælfred.” Mr. Cockayne tells us in his preface ² that Helias sent Alfred “ a recommendation of scammony, which is the juice of a Syrian convolvulus, of gutta ammoniacum,³ of spices, of gum dragon, of aloes, of galbanum, of balsam, of petroleum, of the famous Greek compound preparation called *θηριακή*, and of the magic virtues of alabaster. These drugs are good

¹ *Leech Book*, ii. p. 289.

² *Ibid.*, p. xxv.

³ A valuable expectorant which is largely used at the present time.

in themselves, and such as a resident in Syria would naturally recommend to others." This very singular and instructive fact concerning King Ælfred is one of the most interesting things in Mr. Cockayne's valuable work.

As to the age of the MS., the translator sets it down about A.D. 900. The sources of the information he ascribes to Oxa, Dun, and Helias; there is a mixture of the Hibernian and Scandinavian elements also. Some of the prescriptions are traceable to Latin writers, and large extracts are made from the Greek physicians. Paulus Ægineta is responsible for the long passage on hiccupings (or Hicket, as the *Leech Book* calls the malady), as chapter xviii. is almost identical with Paulus Ægin., lib. ii. sect. 57. Mr. Cockayne thinks that the number of passages the Saxon drew from the Greek would make perhaps one-fourth of the first two books. Whether they came direct from the Greek manuscripts or at second hand as quotations, it is not possible to say. Quoting M. Brechillet Jourdain,¹ Mr. Cockayne says that it is shown that the wise men of the Middle Ages long before the invention of printing possessed Latin translations of Aristotle; there is every probability, therefore, that they would be familiar with the works of the Greek physicians. Some of them could translate Greek. If an Italian or Frenchman could acquire Greek and turn it into Latin, a Saxon might do as much. Bede and his disciples could certainly have done so. Bede says that Tobias, Bishop of Rochester, was as familiar with the Greek and Latin languages as with his own. "It appears, therefore," concludes Mr. Cockayne, "that the leeches of the Angles and Saxons had the means, by personal industry or by the aid of others, of arriving at a competent knowledge of the contents of the works of the Greek medical writers. Here, in this volume, the results are visible. They keep, for the most part, to the diagnosis and the theory; they go back in the prescriptions to the easier remedies; for whether in Galen or others, there was a chapter on the *εὐπόριστα*, the 'parabilia,' the resources of country practitioners, and of course, even now, expensive medicines are not prescribed for poor patients."²

In the very valuable Saxon *Leechdoms*³ we have an excellent account of the state of medicine as practised in England before the Norman Conquest. The *Leech Book* (*Læce Boc*)⁴ is a treatise on medicine which probably belonged to the abbey of Glastonbury. The manu-

¹ *Recherches critiques sur l'âge et origine des traductions Latines d'Aristote.* Paris, 1819.

² *Saxon Leechdoms*, vol. ii., Preface, p. xxix.

³ *Leechdoms, Wortcunning, and Starcraft of Early England*, vol. ii. Edited by Rev. O. Cockayne. (Rolls Series.)

⁴ *MS. Reg.*, 12. D. xvii.

script, thinks Mr. Cockayne, belonged to one Bald, a monk. The book, says the editor, is learned in a literary sense, but not in a professional, for it does not really advance man's knowledge of disease or of cures. He may have been a physician, he was certainly a lover of books—"nulla mihi tam cara est optima gaza quam cari libri." The work seems to imply that there was a school of medicine among the Saxons. In the first book, p. 120, we read that "Oxa taught us this leechdom"; in the second book, p. 293, we are told concerning a leechdom for lung disease that "Dun taught it"; again we find "some teach us." So far as book learning was concerned, there was certainly a sort of medical teaching. It was perhaps merely taken from the Greek by means of a Latin translation of Trallianus, Paulus of Ægina, and Philagrius. As examples of reasonable treatment take that for hare-lip (or hair-lip as in the text): "Pound mastic very small, add the white of an egg, and mingle as thou dost vermilion, cut with a knife the false edges of the lip, sew fast with silk, then smear without and within with the salve, ere the silk rot. If it draw together, arrange it with the hand, anoint again soon."¹

Against pediculi quicksilver and old butter are to be mingled together in a mortar, and the resulting salve to be applied to the body. This is precisely the mercurial ointment of modern pharmacy used for the same purpose.

Religion, magic, and medicine were oddly mixed up by our Saxon forefathers. Thus the *Leech Book* tells us² for the "dry" disease we should "delve about sour ompre (i.e. *sorrel dock*), sing thrice the Pater noster, jerk it up, then while thou sayest sed libera nos a malo, take five slices of it and seven peppercorns, bray them together, and while thou be working it, sing twelve times the psalm Miserere mei, Deus, and Gloria in excelsis deo, and the Pater noster; then pour the stuff all over with wine, when day and night divide, then drink the dose and wrap thyself up warm." Here is an exorcism for fever. "A man shall write this upon the sacramental paten, and wash it off into the drink with holy water, and sing over it. . . . In the beginning, etc. (John i. 1). Then wash the writing with holy water off the dish into the drink, then sing the Credo, and the Paternoster, and this lay; Beati immaculati, the psalm (cxix.), with the twelve prayer psalms, I adjure you, etc. And let each of the two³ then sip thrice of the water so prepared."⁴ The demon theory of disease was still in force; even at Glastonbury we find the following exorcism:⁵ "For a fiend sick man, when a devil possesses

¹ *Leech Book*, I. xiii. p. 57.

² The doctor and the patient.

³ *Ibid.*, vol. ii. pp. 137-8.

⁴ *Saxon Leechdoms*, vol. ii. p. 117.

⁵ *Saxon Leechdoms*, vol. ii. p. 137.

the man or controls him from within with disease ; a spew drink, lupin, bishopwort, henbane, cropleek ; pound *these* together, add ale for a liquid, let stand for a night, add fifty libcorns (or *cathartic grains*), and holy water. A drink for a fiend sick man, to be drunk out of church bell."¹

"Githrife, cynoglossum, yarrow, lupin, betony, attorlothe, cassock, flower de luce, fennel, church lichen, lichen, of Christ's mark or crosse, lovage ; work up the drink off clear ale, sing seven masses over the worts, add garlic and holy water, and drip the drink into every drink which he will subsequently drink, and let him sing the psalm, Beati immaculati, and Exurgat, and Salvum me fac, Deus,² and then let him drink the drink out of a church bell, and let the mass priest after the drink sing this over him : Domine, sancte pater omnipotens."³ Again, "For the phrenzied ; bishopwort, lupin, bonewort, everfern,⁴ githrife, elecampane ; when day and night divide, then sing thou in the church litanies, that is, the names of the hallows or saints, and the Pater-noster ; with the song go thou, that thou mayest be near the worts and go thrice about them, and when thou takest them go again to church with the same song, and sing twelve masses over them, and over all the drinks which belong to the disease, in honour of the twelve apostles."⁵

The *Leech Book* has "a salve agst nocturnal goblin visitors," a remedy "against a woman's chatter," which is to go to bed, having eaten only a root of radish ; "that day the chatter cannot harm thee."⁶ Red niolin, a plant which grows by running water, if put under the bolster, will prevent the devil from scathing a man within or without. There is "a lithe drink against a devil and dementedness," and a cure for a man who is "overlooked."

If the man's face is turned toward the doctor when he enters the sick room, "then he may live ; if his face be turned from thee, have thou nothing to do with him." "In case a man be lunatic, take of a mere-swine or porpoise, work it into a whip, swinge the man therewith ; soon he will be well. Amen."⁷

A salve against temptation of the devil contains many herbs, must have nine masses said over it, and must be set under the altar for a while ; then it is very good for every temptation of the fiend, and for a man full of elfin tricks, and for typhus fever.⁸

¹ Church bells were anciently used more to frighten the fiends away than for calling together the worshippers.

² Psalms cxix., lxxviii., and lxxix.

³ A formula of Benediction.

⁴ *Polypodium vulgare*.

⁵ *Saxon Leechdoms*, vol. ii. pp. 138-9.

⁶ *Leech Book*, III. vol. ii. p. 343.

⁷ *Saxon Leechdoms*, vol. ii. p. 335.

⁸ *Ibid.*, p. 335.

Cancer is to be cured with goat's gall and honey. Our forefathers made very light of such trifles as cancer and lunacy, it will be perceived. Joint pains (rheumatism) are cured by singing over them, "*Malignus obligavit; angelus curavit; dominus salvavit,*" and then spitting on the joints. "It will soon be well with him," adds the Saxon leech, in his usual cheery manner. Pepper is to be chewed for the toothache; "it will soon be well with them." Horrible applications of pepper, salt, and vinegar were recommended to be applied to sore eyes. If the eyes were swollen, "take a live crab, put his eyes out, and put him alive again into the water, and put the eyes on the neck of the man who hath need; he will soon be well."

There are light drinks "against the devil and want of memory," "for a wild heart," and "pain of the maw." There is treatment for the bite of "a gangwayweaving spider," and remedies in case a woman cannot "kindle a child." Neuralgia and megrims are not the new disorders they are generally supposed to be, as we find remedies "for headache, and for old headache, and for ache of half of the head."

"Poison" was lightly treated with holy water and herbs. Snake-bite was cured with ear-wax and a collect. For bite of an adder you said one word "*Faul*"; "it may not hurt him." "Against bite of snake, if the man procures and eateth rind, which cometh out of paradise, no venom will damage him. Then said he that wrote this book that the rind was hard gotten." If, by chance, one drank a creeping thing in water, he was to cut into a sheep instantly and drink the sheep's blood hot. Lest a man tire with much travelling over land, he must take mugwort and put it into his shoe, saying, as he pulls up the root, "I will take thee, artemisia, lest I be weary on the way;" and having taken it, he must sign it with the sign of the cross.

"Over the whole face of Europe, while the old Hellenic school survived in Arabia, the next to hand resource became the established remedy, and the searching incision of the practised anatomist was replaced by a droning song."²

Such medical learning as existed amongst the Angles, Saxons, and Goths was found only in a corrupted state in the monasteries. As we have seen, the herbal remedies were, for the most, useless or worse, and the treatment was so intermingled with magic ceremonies and religious superstitious uses, that Greek science, so far as it related to the healing art, was all but smothered by absurdities.

"The Saxon leeches were unable to use the catheter, the searching knife, and the lithotrite; they knew nothing of the Indian drugs, and

¹ *Saxon Leechdoms*, vol. ii. p. 307.

² *Ibid.*, vol. i. Preface, p. xxvii.

were almost wholly thrown back on the lancet wherewith to let blood, and the simples from the field and garden.”¹

“For a very old headache” one must “seek in the maw of young swallows for some little stones, and mind that they touch neither earth, nor water, nor other stones; look out three of them, put them on the man; he will soon be well. They are good for head ache and for eye wark, and for the fiend’s temptations, and for the night mare, and for knot, and for fascination, and for evil enchantments by song.”²

As a specimen of a regular Anglo-Saxon prescription, take the following, as given in the MS. Cott. : Vitellius; c. 3 :—

For the foot-adle (the gout), “Take the herb datulus, or titulosa, which we call greater crauleac—tuberosa isis. Take the heads of it and dry them very much, and take thereof a pennyweight and a half, and the pear tree and Roman bark, and cummin, and a fourth part of laurel-berries, and of the other herbs half a pennyweight of each, and six peppercorns, and grind all to dust, and put two egg-shells full of wine. This is true leechcraft. Give it the man till he be well.”

Venesection was in use, but it must have often done more harm than good, as its use was regulated, not so much by the necessities of the case as by the season and courses of the moon. Bede gives a long list of times when bleeding was forbidden. In the Cottonian library there is a Saxon MS., which tells us that the second, third, fifth, sixth, ninth, eleventh, fifteenth, seventeenth, and twentieth days of the month are bad for bleeding.

MEDICINE OF THE WELSH.

The Welsh claim that medicine was practised as one of “the nine rural arts,” by the ancient Cymry, before they became possessed of cities and a sovereignty, that is, before the time of Prydain ab Ædd Mawr, that is to say, about a thousand years before the Christian era.³

As in other nations of antiquity, the practice of medicine was in the hands of the priests, the GWYDDONIAID, or men of knowledge: they were the depositaries of such wisdom as existed in the land, and they practised almost entirely by means of herbs. The science of plants was one of the three sciences, the others being theology and astronomy.⁴

In the following Triad (one of the poetical histories of the Welsh bards) we learn that,—“The three pillars of knowledge, with which the Gwyddoniaid were acquainted, and which they bore in memory from the beginning: the first was a knowledge of Divine things, and of such matters as appertain to the worship of God and the homage due to

¹ *Saxon Leechdoms*, vol. i. Preface, pp. xxvi., xxvii. ² *Leech Book*, iii. p. 307.

³ *Myv. Arch.*, iii. p. 129.

⁴ *Meddygon Myddfai*, Preface, p. ix.

goodness; the second, a knowledge of the course of the stars, their names and kinds, and the order of times; the third, a knowledge of the names and use of the herbs of the field, and of their application in practice, in medicine, and in religious worship. These were preserved in the memorials of vocal song, and in the memorials of times, before there were bards of degree and chair.”¹

The Welsh do not appear to have had any gods of medicine or to have pretended to derive their knowledge of the healing art from any divinities. In the reign of Prydian the Gwyddoniaid were divided into three orders, Bards, Druids, and Ovates. The Ovates occupied themselves especially with the natural sciences. In the Laws of Dyvnwal Moelmud, “medicine, commerce, and navigation” were termed “the three civil arts.”²

This legislator lived about the year 430 B.C., at which early period it would seem that the art of medicine was encouraged and protected by the State.³

As Hippocrates lived 400 B.C., it has been thought possible that the British Ovates may have learned something of his teaching from the Phoceans, who traded between Marseilles and Britain. Later we have proof that the physicians of Myddvai held the Father of Medicine in great esteem.

It is customary amongst the English to ridicule the pretensions of the Welsh to the high antiquity of their knowledge of the arts and sciences, but classical writers bear witness to the wisdom and learning of the Druids. Strabo speaks of their knowledge of physiology. Cicero was acquainted with one of the Gallic Druids, who was called Divitiacus the Ædunan, and claimed to have a thorough knowledge of the laws of nature. Pliny mentions the plants used as medicines by the Druids, such as the mistletoe, called *Oll iach, omnia sanantem*, or “All heal,” the selago (*Lycopodium selago*, or Upright Fir Moss), and the Samolus or marshwort (*Samolus valerandi*, or Water Pimpernel).⁴

One of the Medical Triads in the Llanover MS. is that by Taliesin; it runs thus:—

“There are three intractable substantial organs: the liver, the kidney, and the heart.

“There are three intractable membranes: the dura mater, the peritoneum, and the urinary bladder.

“There are three tedious complaints: disease of the knee joint, disease of the substance of a rib, and phthisis; for when purulent matter has formed in one of these, it is not known when it will get well.”

¹ Llanover MS.

² *Ancient Laws and Institutions of Wales*, vol. ii. p. 515.

³ *Meddygon Myddfai*, p. xi.

⁴ *Ibid.*, p. xiii.

Howel Dda (or the good) in the year 930 A.D. compiled the following laws of the Court Physician :—

“Of the mediciner of the household, his office, his privilege, and his duty, this treats.

1. The twelfth is the mediciner of the household.

2. He is to have his land free : his horse in attendance : and his linen clothing from the queen, and his woollen clothing from the king.

3. His seat in the hall within the palace is at the base of the pillar to which the screen is attached, near which the king sits.

4. His lodging is with the chief of the household.

5. His protection is, from the time the king shall command him to visit a wounded or sick person, whether the person be in the palace or out of it, until he quit him, to convey away an offender.

6. He is to administer medicine gratuitously to all within the palace, and to the chief of the household ; and he is to have nothing from them except their bloody clothes, unless it be for one of the three dangerous wounds, as mentioned before ; these are a stroke on the head unto the brain ; a stroke in the body unto the bowels ; and the breaking of one of the four limbs ; for every one of these three dangerous wounds the mediciner is to have nine score pence and his food, or one pound without his food, and also the bloody clothes.

7. The mediciner is to have, when he shall apply a tent, twenty-four pence.

8. For an application of red ointment, twelve pence.

9. For an application of herbs to a swelling, four legal pence.

10. For letting blood, fourpence.

11. His food daily is worth one penny half-penny.

12. His light every night is worth one legal penny.

13. The worth of a medical man is one penny.

14. The mediciner is to take an indemnification from the kindred of the wounded person, in case he die from the remedy he may use, and if he do not take it, let him answer for the deed.

15. He is to accompany the armies.

16. He is never to leave the palace, but with the king's permission.

17. His saraad is six kine, and six score of silver, to be augmented.

18. His worth is six score and six kine, to be augmented.”

Elsewhere we meet with the following particulars :—

“Of the three conspicuous scars this is :

“There are three conspicuous scars : one upon the face ; another upon the foot ; and another upon the hand ; thirty pence upon the foot ; three-score pence upon the hand ; six-score pence on the face. Every unexposed scar, fourpence. The cranium, fourpence.”¹

¹ *Ancient Laws and Institutes of Wales*, vol. i. p. 41 etc.

"For every broken bone, twenty pence ; unless there be a dispute as to its diminutiveness ; and if there be a dispute as to the size, let the mediciner take a brass basin, and let him place his elbow upon the ground, and his hand over the basin, and if its sound be heard, let four legal pence be paid ; and if it be not heard, nothing is due."¹

This singular test is explained in another passage, thus :—

"Four curt pennies are to be paid to a person for every bone taken from the upper part of the cranium, which shall sound on falling into a copper basin."²

A very curious regulation was that if the physician got drunk and anybody insulted him, he could claim no recompense, because "he knew not at what time the king might want his assistance."

The physicians of Myddvai flourished in the time of Rhys Gryg in the early part of the thirteenth century. His domestic physician was Rhiwallon, who was assisted by his three sons Cadwgan, Gruffydd, and Einion. They lived at Myddvai, in the present county of Caermarthen. By command of the prince, these physicians made a collection of the most valuable prescriptions for the treatment of the various diseases of the human body. This collection was not reduced to writing previously, though many of the recipes were no doubt in use some centuries before. The original manuscript is in the British Museum, and there is a copy in Jesus College, Oxford, in the *Red Book*, which has been published with an English translation by the Welsh MSS. Society.³ The descendants of this family of physicians continued to practise medicine without intermission until the middle of the last century. This most interesting volume also contains a second portion, which purports to be a compilation by Howel the physician, son of Rhys, son of Llewelyn, son of Philip the physician, a lineal descendant of Einion the son of Rhiwallon. Some medical prescriptions assumed the form of proverbs such as the following :—

MEDICAL MAXIMS.

(*From the Book of Iago ab Dewi.*)

"He who goes to sleep supperless will have no need of Rhiwallon of Myddvai.

A supper of apples—breakfast of nuts.

A cold mouth and warm feet will live long.

To the fish market in the morning, to the butcher's shop in the afternoon.

Cold water and warm bread will make an unhealthy stomach.

¹ *Ancient Laws and Institutes of Wales*, vol. i. p. 315.

² *Ibid.*, p. 507.

³ *The Physicians of Myddvai*, Llandoverly, 1861.

The three qualities of water : it will produce no sickness, no debt, and no widowhood.

To eat eggs without salt will bring on sickness.

It is no insult to deprive an old man of his supper.

An eel in a pie, lampreys in salt.

An ague or fever at the fall of the leaf is always of long continuance, or else is fatal.

A kid a month old—a lamb three months.

Dry feet, moist tongue.

A salmon and a sermon in Lent.

Supper will kill more than were ever cured by the physicians of Myddvai.

A light dinner, a less supper, sound sleep, long life.

Do not wish for milk after fish.

To sleep much is the health of youth, the sickness of old age.

Long health in youth will shorten life.

It is more wholesome to smell warm bread than to eat it.

A short sickness for the body, and short frost for the earth, will heal ; either of them long will destroy.

Whilst the urine is clear, let the physician beg.

Better is appetite than gluttony.

Enough of bread, little of drink.

The bread of yesterday, the meat of to-day, and the wine of last year will produce health.

Quench thy thirst where the washerwoman goes for water.

Three men that are long-lived : the ploughman of dry land, a mountain dairyman, and a fisherman of the sea.

The three feasts of health : milk, bread, and salt.

The three medicines of the physicians of Myddvai : water, honey, and labour.

Moderate exercise is health.

Three moderations will produce long life ; in food, labour, and meditation.

Whoso breaks not his fast in May, let him consider himself with the dead.

He who sees fennel and gathers it not, is not a man, but a devil.

If thou desirest to die, eat cabbage in August.

Whatever quantity thou eatest, drink thrice.

God will send food to washed hands.

Drink water like an ox, and wine like a king.

One egg is economy, two is gentility, three is greediness, and the fourth is wastefulness.

If persons knew how good a hen is in January, none would be left on the roost.

The cheese of sheep, the milk of goats, and the butter of cows are the best.

The three victuals of health : honey, butter, and milk.

The three victuals of sickness : flesh meat, ale, and vinegar.

Take not thy coat off before Ascension day.

If thou wilt become unwell, wash thy head and go to sleep.

In pottage without herbs there is neither goodness nor nourishment.

If thou wilt die, eat roast mutton and sleep soon after it.

If thou wilt eat a bad thing, eat roast hare.

Mustard after food.

He who cleans his teeth with the point of his knife may soon clean them with the haft.

A dry cough is the trumpet of death."

One of the laws of Howel Dda permitted divorce for so trifling a cause as an unsavoury or disagreeable breath.¹

Poppies bruised in wine were used to induce sleep. For agues the treatment was to write in three apples on three separate days an invocation to the Trinity ; "on the third day he will recover." Saffron was used for many complaints ; it is a drug still largely used by the poor, who have unbounded faith in it, but it is almost inert. If a person lost his reason, he was ordered to take primrose juice, "and he will indeed recover." There were regular tables of lucky and unlucky days for bleeding. Fennel juice was supposed to act as a sort of anti-fat, and the roots of thistles were given as a purgative. If a snake should crawl into a man's mouth, the patient was to take camomile powder in wine. An irritable man was to drink celery juice ; "it will produce joy." As we might have expected, the leek was supposed to have many virtues ; wives who desired children were told to eat leeks. Leek juice and woman's milk was good for whooping cough. The juice was also used for deafness, heart-burn, headache, and boils. Mustard purifies the brain, is an antidote to the bite of an adder, is good for colic, loss of hair, palsy, and many other things. To ascertain the fate of a sick person, bruise violets and apply them to the eyebrows ; "if he sleep, he will live, but if not he will die."

Radishes were supposed to prevent hydrophobia. "That is the greatest remedy, to remove a bone from the brain (to trephine) with safety." Dittany was the antidote for pain. Mouse-dung was used as a remedy for spitting of blood, and a plaster of cow-dung for gout. An eye-water was made from rotten apples. The berries of mistletoe were

¹ *Leges Wallica*, l. 4. Henry's *Hist. of Eng.*, vol. i. p. 320.

made into a confection as a remedy for epilepsy. "Let the sick person eat a good mouthful (they gave large doses in those days) thereof, fasting morning, noon, and night. It is proven." Sage was supposed to strengthen the nerves (nerves in those days!). Nettles, goose-grass, blessed-thistle, and rosemary were favourite remedies. Then we have numerous curious charms and "medical feats discovered through the grace of God." Here is one: "Take a frog alive from the water, extract his tongue (frogs have long been subject to vivisection), and put him again in the water. Lay this same tongue upon the heart of sleeping man, and he will confess his deeds in his sleep." A charm for the toothache runs thus: "Saint Mary sat on a stone, the stone being near her hermitage, when the Holy Ghost came to her, she being sad. Why art thou sad, mother of my Lord, and what pain tormenteth thee? My teeth are painful, a worm called megrim has penetrated them, and I have masticated and swallowed it. I adjure thee, daffin O negrbina, by the Father, and the Son, and the Holy Ghost, the Virgin Mary, and God, the munificent physician, that thou dost not permit any disease, dolour, or molestation to affect this servant of God here present, either in tooth, eye, head, or in the whole of her teeth together. So be it. Amen."

All the herbs and plants (so far as was possible) which were used in the doctor's practice were directed to be grown by him in his garden and orchard, so that they might be at hand when required.

In the table of weights and measures used by the ancient Welsh physicians, we learn that twenty grains of wheat make one scruple, four podfuls make one spoonful, four spoonfuls make one eggshellful, four eggshellfuls make one cupful. The physician also for his guidance had the following curious table:—Four grains of wheat=one pea, four peas=one acorn, four acorns=one pigeon's egg, four pigeon's eggs=one hen's egg, four hen's eggs=one goose's egg, four goose's eggs=one swan's egg.

"For treating a stroke on the head unto the brain, a stroke in the body unto the bowels, and the breaking of one of the four limbs, the wounded person was to receive three pounds from the one who wounded him; and that person had also to pay for the medical treatment of the sufferer a pound without food, or nine-score pence with his food, and the bloody clothes."¹

The physicians of Myddvai recognised five kinds of fevers; viz., latent, intermittent, ephemeral, inflammatory, and typhus. The doctor's "three master difficulties" were a wounded lung, a wounded mammary gland, and a wounded knee joint. "There are three bones which will never unite when broken—a tooth, the knee pan, and the os frontis."

¹ *Ancient Laws, etc., of Wales*, v. i. p. 313.

CHAPTER II.

MOHAMMEDAN MEDICINE.

Sources of Arabian Learning.—Influence of Greek and Hindu Literature.—The Nestorians.—Baghdad and its Colleges.—The Moors in Spain.—The Mosque Schools.—Arabian Inventions and Services to Literature.—The great Arab Physicians.—Serapion, Rhazes, Ali Abbas, Avicenna, Albucasis, and Averroes.

AT the time of the incursions of the barbarians of the North, when Spain, the South of France, Italy, and North Africa, with their adjacent islands, were ravaged by these hordes, multitudes of those who could escape so far found a refuge in the East; and there is good reason for supposing that by such means a vast store of the accumulated knowledge of civilized Europe found its way to Eastern lands. Science in its turn has come back to us through the Saracens, who afterwards invaded Southern Europe.¹

It is not correct to speak of the Arabians or the Saracens as the source of the culture which is known as Arabian and Saracenic. The magnificent civilization of the Greek world fell to pieces like a noble but ruined temple, and its precious relics went to form a score of other civilizations which ultimately arose from its ruins. It was not the Semitic peoples of Arabia which restored the philosophy and science of the decayed Græco-Roman world, it was the Persians, the Greeks of Asia Minor, the people of Alexandria, and the cultured Eastern nations, generally, which having been subdued by the Arabs, at once began to impart to their conquerors the culture which they lacked. The ignorant followers of the Prophet who burned the Alexandrian Library knew not what they did; the time was to come when Greek culture was to reach them partly from the city whose literary treasures they had destroyed, and partly through Syrian and Persian influences. By these roads came the medical sciences to the Saracens. The second library of Alexandria, consisting of 700,000 volumes, was destroyed by them, A.D. 642; but we must conclude that many medical and other scientific works were preserved, as the Jews and the Nestorians (banished from Constantinople to Asia) first made the Arabians acquainted with Greek

¹ See on this Balmez, *European Civilization*, p. 214.

authors by translating them into Syriac, whence they were in turn translated into Arabic. Justinian I. (A.D. 529) banished the Platonists of Athens, when Chosrões I., surnamed Nushirwan, or "the generous mind," one of the greatest monarchs of Persia, hospitably received them at his court. He caused the best Greek, Latin, and Indian works to be translated into Persian, and valued Græco-Roman medical science so highly that he offered a suspension of hostilities for the single physician Tribunus.

The East in a great measure owed its acquaintance with the rich treasures of Greek literature to the heresy of Nestorius. Nestorius was a Syrian by birth, and became bishop of Constantinople. Having denied that the Virgin Mary ought to be called "Mother of God," he was summoned to appear before the Council of Ephesus (A.D. 431), and was deposed. Nestorian communities were formed, and the heretical opinions rapidly spread, patronized as they were for political purposes by the Persian kings. The Mahometan conquests in the seventh century by overthrowing the supremacy of orthodoxy, afforded great encouragement to the Nestorians, as by denying that Mary was the mother of God, as the Catholics maintained, the Nestorians in calling her the mother of Christ more nearly approached the Mahometan conception of a pure monotheism. Barsumaas, or Barsaumas, bishop of Nisibis (435-485 A.D.), was one of the most eminent leaders of the new heresy. He succeeded in gaining many adherents in Persia. Maanes, bishop of Ardaschiv, was his principal coadjutor; he was the means of propagating the Nestorian doctrines in Egypt, Syria, Arabia, India, Tartary, and even China.

THE CALIPHS.

In the time of Mohammed himself (569-609), the Arabians had physicians who had been educated in the Greek schools of medicine living amongst them. Pococke mentions a Greek physician named Theodunus, who was in the service of Hajáj Ibn Yúsuf in the seventh century. He wrote a sort of medical compendium for the use of his son. Hajáj seems also to have employed another Greek doctor named Theodocus, who had numerous pupils.¹

The House of Ommiyah encouraged the cultivation of the sciences. The Caliph Moawiyah, who resided at Damascus, founded schools, libraries, and observatories there, and invited the learned of all nations, especially Greeks, to settle there, and teach his people their arts and sciences.²

¹ Pococke, *Hist. Dynast.*, p. 128; Freind, *Hist. Med.*, Lat. Ed., p. 472.

² Puschmann, *Hist. of Med. Educ.*, p. 156.

In the seventh century, Alexandria under the rule of Islam was in possession of many medical schools in which the principles of Galen were taught.¹

Alkinani, an Arabian Christian, who afterwards was converted to Islamism, was chiefly instrumental in introducing medical teaching into Antioch and Harran from Alexandria.²

The Caliph Almamon had studied astronomy. Almamon, the seventh of the Abbassides, collected from Armenia, Syria, and Egypt all the volumes of Grecian science he could obtain; they were translated into Arabic, and his subjects were earnestly exhorted to study them. "He was not ignorant," says Abulpharagius, "that they are the elect of God, His best and most useful servants, whose lives are devoted to the improvement of their rational faculties." Succeeding princes of the line of Abbas, and their rivals the Fatimites of Africa and the Omniades of Spain, says Gibbon, were the patrons of the learned, "and their emulation diffused the taste and the rewards of science from Samarcand and Bochara to Fez and Cordova."³

It was Almamon who caused the works of the fathers of Indian medical science to be translated first into Persian and then into Arabic; thus it was that the Saracens became familiar with the medical wisdom of Susruta and Charaka in the eighth century of our era.⁴

Charaka is frequently mentioned in the Latin translations of Avicenna (Ibn Sina), Rhazes (Al Rasi), and Serapion (Ibn Serabi).⁵

Chaldee works at this time were also translated into Persian. In the first centuries of the Hijra the Caliphs of Baghdad caused a considerable number of works upon Hindu medicine to be translated into Persian.⁶ At the time of Mohammed there existed a famous school of medicine at Senaa in Southern Arabia, the principal of which, Harit Ben Kaldah, had learned his profession in India.⁷

When the son of Mesuach, a young Nestorian Christian, first entered Baghdad, it is said ⁸ that he appeared to have discovered a new world. He applied himself to the study of medicine, philosophy, and astronomy. He became a "treasure of learning," and was chosen to attend Prince Almamon, the son of Haroun-al-Raschid, who, when he became Caliph in 813, invited learned men of all religions and of all nations to his court, collected from them the names of all the great authors and the titles of their books which had been published in

¹ L. Leclerc, *Hist. de la Méd. Arabe*, i. p. 38.

² Freind, *Hist. Med.*, p. 473, Ed. 1733.

⁴ Weber, *Hist. Ind. Lit.*, p. 266.

⁶ Weber, p. 266.

⁸ Leo Afric., *De viris Illust. ap. Arab. Bib.*

³ *Decline and Fall*, etc., ch. lii.

⁵ Royle, *Antiquity of Hindu Medicine*.

⁷ Puschmann, p. 160.

Greek, Syriac, and Persian, and then sent to all parts of the world to purchase them.

The Arabs studied Aristotle; and when Western Europe had long been sunk in intellectual darkness and had forgotten him, the Saracens taught him to the Christians of the West. "He was read at Samarcand and at Lisbon," says Freeman, "when no one knew his name at Oxford or Edinburgh."¹ In his own tongue at Constantinople and Thessalonica he had never been forgotten. Such learning and science as the Saracens did not receive from India, such as the Arabic numerals, came to them from the West. They developed and improved much, but they probably invented nothing. Freeman says² that after careful investigation he observed three things: first, that whatever the Arabs learned was from translations of Greek works; secondly, that they made use of only an infinitesimal portion of Greek literature; thirdly, that many of their most famous literary men were not Mahometans at all, but Jews or Christians.³ Greek poetry, history, and philosophy had little charm for them. Gibbon says there is no record of an Arabian translation of any Greek poet, orator, or historian.⁴

Learned Nestorians, Jacobites, and Jews in Persia and Syria occupied themselves with translations from Greek authors, and contributed greatly to the extension of Western culture in Eastern lands.⁵ To the world at large Mahomet was but an impostor; to the Arab of the seventh century he was a true prophet and the greatest of benefactors.

When the Persian king reproached the Arabs with their poverty and their savage condition, the reply of the Saracen envoy contains a grand summary of the immediate results of Mahomet's teaching.⁶

"Whatever thou hast said," replied Sheikh Maghareh, "respecting the former condition of the Arabs is true. Their food was green lizards; they buried their infant daughters alive; nay, some of them feasted on dead carcasses and drank blood; while others slew their relations, and thought themselves great and valiant, when by such an act they became possessed of more property; they were clothed with hair garments; knew not good from evil; and made no distinction between that which is lawful and that which is unlawful. Such was our state. But God, in His mercy, has sent us by a holy prophet a sacred volume, which teaches us the true faith."⁷

GEORGE BACKTISCHWAH, or BOCHT JESU, was a Greek physician, a descendant of the persecuted Christians of the Greek empire, who embracing the heresy of Nestorius had been compelled to fly for safety

¹ *The Saracens*, p. 191.

² *Ibid.*

³ *Ibid.*, pp. 191, 192.

⁴ *Decline and Fall*, etc., ch. lii.

⁵ Puschmann, *Hist. Med. Educ.*, p. 158.

⁶ Freeman's *Saracens*, p. 54.

⁷ Kingsley's *Alexandria*, p. 148.

and peace to the Persians. Al-Manzor (754-775) invited Backtischwah to his court, and this physician was the first to present to the Arabians translations of the medical works of the Greeks. The Nestorians had founded a school of medicine in the province of Gondisapor, which was already famous in the seventh century. From this school issued a crowd of learned Nestorians and Jews, famous for their knowledge of medicine and surgery, but still more for their ability to endow the East with all the treasures of Greek literature.¹

BAGHDAD.

The city of Baghdad was built by the Caliph Almansor, in A.D. 763, on the ruins of a very ancient city ; it soon became the most splendid city in the East. Almansor had personally cultivated science, and was a lover of letters and of learned men. He offered rewards for translations of Greek authors on philosophy, astronomy, mathematics, and medicine.

A college was established by the Caliph which ultimately became famous. Public hospitals and a medical school were also established by the same enlightened ruler. Meryon says² that there is reason to suppose that in the laboratories established at Baghdad for the preparation of medicines the science of chemistry may have first originated.³

The son of Mesuach presided over the translations of the works of Galen and all the treatises of Aristotle into Arabic ; but when they had extracted the science from Greek literature, they consigned all the rest of it to the flames, as dangerous to the Moslem faith.⁴

Many Christian physicians were employed at Baghdad.

The vizier of a Sultan gave two hundred thousand pieces of gold to found a college at Baghdad, which he endowed with an annual revenue of fifteen thousand dinars.⁵ Under the reign of Haroun-al-Raschid and his successors this school flourished vigorously, and many translations of Greek medical works were made therein.

The Arabians have greatly distinguished themselves in the science of medicine. In the city of Baghdad eight hundred and sixty physicians, says Gibbon, were licensed to practise. The names of Mesua and Geber, of Rhazis and Avicenna are not less famous than are those of the greatest names amongst the Greeks themselves. The independent medical literature of the Saracens arose in the ninth century, and gradually developed

¹ Sismondi, *Literature of Europe*, vol. i. p. 51.

² *Hist. Med.*, p. 123.

³ See Thompson's *Hist. Chem.*, vol. i. p. 112.

⁴ Berington's *Lit. Hist. Middle Ages*, p. 415.

⁵ Gibbon, *Decline and Fall*, etc., ch. lii.

till it reached the zenith of its glory in the eleventh. The mosques were then the universities, and besides that of Baghdad, Bassora, Cufa, Samarcand, Ispahan, Damascus, Bokhara, Firuzabad, and Khurdistan, not omitting the schools of the Fatimites in Alexandria, were centres of Eastern science and art, and the equally famous universities of Cordova, Seville, Toledo, Almeria, Murcia, Granada, and Valencia, sustained in Europe the dignity of the Arabian learning. When the conquest of Africa was complete, Spain was invaded, and about the year 713 was reduced to a Moslem province. Cordova became not less distinguished for learning than Baghdad, and many writers were given to the world from the adjacent towns of Malaga, Almeria, and Murcia. Gibbon says that above seventy public libraries were opened in the cities of Andalusia.

In the words of Professor Nicholl, "The Semitic race is essentially unscientific, and adverse to the presentation of philosophical or moral truth in a scientific form. The Indo-European genius, on the contrary, tends irresistibly towards intellectual system, or science." This will at once be perceived when we examine the Vedas, the works of any Greek author, or those of Teutonic speculative writers, and then turn to any Semitic books. We instantly perceive that in the latter we have nothing but belief or intuition, with more or less of the doctrine of Revelation or Inspiration. In the works of Aryan origin, on the contrary, we are at the opposite pole; we have speculation, inquiry, an insatiable desire to solve the mystery of things—the analytical spirit which asks a reason for every phenomenon in the universe. In the Semitic races this resolves itself into either a living faith and a pure life corresponding thereto, or into a reckless fanaticism founded on fatalism. In the Aryan races we have the most daring intellectual activity, or the driest dogmatism.¹

It was in Spain that the Semitic and Aryan intellects met and happily blended. Spain remembered the advantages of Roman influences long after they were withdrawn. The Goths, who spread themselves over the Peninsula, preserved the remains of the civilization which the Romans had left; and the Jews, afterwards to be treated with such cruel and base ingratitude by the nation which they had so greatly benefited, advanced the cause of education by their numerous schools and learned writers.²

On this stage, then, we find the Semitic and the Indo-Germanic races transferring to each other the characteristics with which they were most happily endowed by nature.

The mosque schools of the Arabians were conducted on the model of

¹ *Imp. Dict. Biog.*, art. "Averrhoës."

² Puschmann, p. 162.

the Alexandrian schools. The old Egyptian and Jewish colleges were to some extent the prototypes of these, and some writers think that our own universities were suggested by those of the Saracens. How great and famous some of these must have been, may be learned from the fact that, as we have stated, no less than six thousand professors and students were collected together at Baghdad at one time. There were lecture rooms, laboratories, hospitals, and residences for teachers and students, besides the great halls which must have been required for the vast libraries which the Caliphs collected. It was in Spain perhaps that Saracenic learning shone most brilliantly. In the early part of the eighth century was founded the noble university of Cordova, the city which, under Arabian rule, was called the "Centre of Religion, the Mother of Philosophers, the Light of Andalusia." It contained 300 mosques, 200,000 houses, and 1,000,000 inhabitants, besides forty hospitals.¹

Abou-Ryan-el-Byrouny (died 941) travelled forty years studying mineralogy, and his treatise on precious stones, says Sismondi,² is a rich collection of facts. Aben-al-Beïthar of Malaga travelled over all the mountains and plains of Europe in search of plants, and rendered most important services to botany. He wandered over the sands of Africa and the remotest countries of Asia, examining and collecting animals, fossils, and vegetables, and published his observations in three volumes, which contained more science than any naturalist had previously recorded.³

In one sense the Arabians were the inventors of chemistry, and never was the science applied to the arts of life more beneficially than by the Saracens in Spain.

Mahomet was skilled in the knowledge of medicine, and certain of his aphorisms are extant concerning the healing art. Gibbon says⁴ that the temperance and exercise his followers preached, deprived the doctors of the greater part of their practice. The only medicine recommended by the Koran is honey (see Surah xvi. 71). "From its (the bee's) belly cometh forth a fluid of varying hues, which yieldeth medicine to man." There is evidence of a belief in magic in the Koran as a charm against evil, and of incantations capable of producing ill consequences to those against whom they were directed. The 113th chapter of the Koran was written when Mohammed believed that, by the witchcraft of wicked persons, he had been afflicted with rheumatism. Mohammedan peoples use as amulets to avert evil from themselves or possessions, a small Koran encased in silk or leather, or some of the

¹ Baas, *Hist. Med.*, p. 220.

² *Literature of Europe*, vol. i. p. 66.

³ *Ibid.*

⁴ *Decline and Fall*, etc., chap. lii.

names of God, or of the prophets or saints, or the Mohammedan creed engraven on stone or silver.

Da'wah, or the system of incantation used by Mohammedans, is employed to cause the cure, or the sickness and death of a person. The Mohammedans have an elaborate system of exorcism, which is fully explained by Mr. Thomas Patrick Hughes.¹

Uroscopy, or the art of judging diseases by inspection of the urine, was a great feature of Arabian as of Greek medical practice. It was, however, with the former usually conducted with jugglery and charlatanism, and there was seldom anything scientific about it.

As the religion of the Moslems forbade dissection, the sciences of anatomy and physiology and the art of surgery remained as they were borrowed from the Greek writers.

The Arabian faculty always stipulated for their fees beforehand; they disapproved of gratuitous treatment, because, as they declared, "no one gets even thanks for it!"

There must have been female doctors, who, in the East, had abundant opportunities for practice, as men were not permitted by the customs of the times to examine women. These female obstetricians performed the gravest operations, such as embryotomy and lithotomy.²

Hospitals were established at Damascus for lepers, the poor, the blind, and the sick, under the rule of the Caliph Walid.

Paper is an Arabic invention. True, it has been made from silk from the remotest ages in China, but by the Arabs it was first made at Samarcand, A.D. 649; and cotton paper, such as we use now, was made at Mecca, A.D. 706. The art was soon afterwards introduced by the Arabs into Spain, where it was brought to the highest perfection.³ Gunpowder was known to the Arabs a hundred years before Europeans mention it.⁴ The compass was used by them nearly two centuries before the Italians and French used it. The number of Arabic inventions which we unsuspectingly enjoy, without being aware of their origin, is prodigious. Could we bring to light the literary treasures of the Escorial, we should know something of the industrious host of Arabians who have done so much for the learning of the Western world, and whose names and deeds have received from us no recognition. Their historical, geographical, and scientific dictionaries and histories would alone entitle them to the gratitude of an age which would know how to appreciate them.

Sismondi says that "Medicine and philosophy had even a greater number of historians than the other sciences; and all these different

¹ *Dictionary of Islam*, art. "Da'wah." ² Baas, *History of Medicine*, p. 224.

³ Sismondi, *Literature of Europe*, vol. i. p. 68.

⁴ *Ibid.*

works were embodied in the historical dictionary of sciences compiled by Mohammed-Aba-Abdallah, of Granada."

THE GREAT ARABIAN PHYSICIANS.

HONAIN, a Christian physician, flourished at Baghdad in the middle of the ninth century. He travelled in Greece that he might perfect himself in the language, and he read the works of all the great writers of that country. On his return to Baghdad he was invited by the Caliph to undertake the translation of the Greek authors. His best known translation is *The Aphorisms of Hippocrates with the Commentaries of Galen*. He wrote on midwifery, and was a good oculist.

SERAPION THE ELDER (of Damascus), who flourished in the ninth century, was a Syrian physician, of whom little or nothing is known except that he wrote two works, one of which is in the Bodleian in MS., entitled *Aphorismi magni momenti de Medicina Practica*. The other is entitled *Kunnâsh*, and has been translated into Latin.

The classical period of Arabian medicine begins with—

RHAZES, "the Arabic Galen," whose real name was *Abû Beecr Mohammed Ibn Zacariyâ Ar-Razi*, was born at Rai, near Chorásán, probably about the middle of the ninth century after Christ. His famous work, *On the Small Pox and Measles*, was translated from the original Arabic into Syriac, and from that language into Greek. This is the first extant medical treatise in which the small-pox is certainly mentioned.¹ This famous book has been published in various languages about thirty-five times; a greater number of editions, says Dr. Greenhill, than almost any other ancient medical treatise has passed through. He was skilled in philosophy, astronomy, and music, as well as in medicine, which he began to study when he was forty years old. He became one of the most celebrated physicians of his time, and was appointed physician to the hospital at Rai, and afterwards to that of Baghdad, where he became so famous as a teacher that pupils flocked to him from all parts. He afterwards resided at the court of Cordova. He died at an advanced age about A.D. 932. More than two hundred titles of his works have been preserved; but his small-pox treatise is the only one which has been published in the original Arabic. It is a remarkable and a very interesting fact that he explained the nature of the small-pox and measles by the theory of fermentation.²

The largest work of Rhazes is *Al-Hâwî*, or the *Comprehensive* book, commonly called "Continens." In the Latin translation this fills two folio volumes. Although little more than a sort of medical common-

¹ Dr. W. A. Greenhill, in Smith's *Dict. Classical Biog.*

² *Ibid.*, in life of Rhazes, in *Imp. Dict. Biog.*

place book, it has a value in that it has preserved for us many fragments from the works of ancient physicians which we should not otherwise have possessed. Another important work of Rhazes is the *Ketābu-l-Mansūri*, or *Liber ad Almansorem*, so called from being dedicated to Mansur, prince of Chorásán. It was intended to instruct the physician in everything which it was necessary for him to know. It is chiefly a compilation, but was a popular text-book in the fifteenth and sixteenth centuries. Rhazes taught the external use of arsenic, mercurial ointments, and sulphate of copper, and the internal use of brandy, nitre, borax, coral, and gems.

ALI BEN EL ABBAS (Ali Abbas), who lived in the latter part of the tenth century, was a Persian physician, who wrote a medical text book, entitled the *Royal Book*. Up to the time of Avicenna, this was the standard authority on medicine amongst the Arabs, and was several times translated into Latin. In the theory of medicine and partly in its practice he followed the Greeks, but imitated the use of the excellent materia medica of the Arabs. He wrote also on ophthalmology and obstetrics.

AVICENNA, or EBN SINA, was called "the Prince of Physicians," and was the greatest philosopher produced by the Arabs in the East. He was born in the province of Bokhara, in 980 A.D. It is related that at the age of sixteen he had learned all the science of a physician. Having cured Prince Nouh of a serious malady, he became a court favourite. After travelling for a while he composed his great work, the *Canon of Medicine*, by which his name was made famous both in Asia and Europe for several centuries. In the midst of the troubles of an adventurous life, he wrote a hundred gigantic books, the greatest of which was the *Al-Schefà*.

ISHAK BEN SOLEIMAN (830-940) wrote on dietetics, and is said to have been the first to introduce senna.

SERAPION THE YOUNGER (about 1070). His work, *De Simplicibus Medicamentis*, was published in Latin at Milan in 1473.

MESUË the younger (about 1015) was a pupil of Avicenna, and physician to the court at Cairo. He rendered great services to pharmacy by teaching the method of preparing extracts from medicinal plants.

ALBUCASIS was a skilful Arab physician, who wrote a work on surgery, entitled *Al Tassrif*, which contains much ingenious matter on the appliances of practical surgery. He died at Cordova about 1106. His work treats of the application of the actual cautery, so much employed by the Arabs, of ligation of arteries in continuity, of the danger of amputating above the knee or elbow, of stitching the bowel with threads.

scraped from the intestinal coat, operations for hare-lip and cataract, and fistula by cutting, ligature and cautery. He advised the use of silver catheters as now employed, in place of the copper ones used previously. He recommended anatomy as a valuable aid to surgery.¹

AVENZOAR, one of the most famous of Arabian physicians, was born near Seville in the latter part of the twelfth century. He was instructed in medicine by his father, whose family had long been connected with the healing art. He was the rational improver of Arabian medicine by the rejection of useless theories, and asserted for medicine a place among the advancing sciences of observation. He made it a constant practice to analyse the medicines he used, so that he might acquaint himself with their exact composition. He was loaded with favours by the prince of Morocco, and died at the age of ninety-two in A.D. 1262.

EBN ALBAITHAR (died about 1197) was a Moorish Spaniard, renowned for his medical and botanical science. He traversed many regions of the west of Africa and Asia to enlarge his botanical knowledge. He passed some years at the court of Saladin, and wrote on the *Virtues of Plants*, and on poisons, metals, and animals.

AVERROES, or EBN ROSCH, was born at Cordova in 1126. He learned theology, philosophy, and medicine from the great teachers of his time. He was the greatest Arabian inquirer in the West, as Avicenna was in the East. He exercised the greatest influence both in his own and succeeding ages. He has been called "the Mohammedan Spinoza," having been a religious freethinker. The study of Aristotle awakened in him a species of pantheism. He was more a philosopher than a physician, but as he had made important observations in medicine, he deserves a place amongst the heroes of the healing art. He was bitterly persecuted amongst his co-religionists for treating the Koran as a merely human work. He taught that the small-pox never attacks the same person more than once. In practice he held very rational views of the action of remedies, and taught that the work of the doctor was chiefly to apply general principles to individual cases. He wrote commentaries on Aristotle so famous as to have gained him the name of "the Commentator." He expounded the *Republic* of Plato. He was a most voluminous writer, and was considered by his contemporaries and by our schoolmen as a prodigy of science.²

There is a very interesting account of the Indian physicians at the court of Baghdad in a translation made from a MS. in the Rich collection in the British Museum.³ The history is from the work of Ibn Abu

¹ Baas, *Hist. Med.*, p. 231.

² Berington, *Lit. Hist. Middle Ages*, p. 428.

³ *Journal of the Royal Asiatic Society*, vol. vi. pp. 105-119.

Usaibiâh, who lived at the beginning of the thirteenth century of our era.

Kankah the Indian was a great philosopher as well as a physician; he investigated the properties of medicines "and the composition of the heavenly bodies" (!).

Sanjahal, another learned Indian, wrote on medicine and astrology. From the science of the stars he applied himself to the symptoms of diseases, on which he wrote a book in ten chapters. He gave the symptoms of four hundred and four diseases. He also wrote on *The Imagination of Diseases*. Shánák wrote on poisons and the veterinary art. Jawdar was a philosopher and a physician who wrote a book on nativities. Mankah the Indian was learned in the art of medicine, and "gentle in his method of treatment." He lived in the days of Haroun-al-Raschid.

Salih, son of Bolah the Indian, was "well skilled in treatment, and had power and influence in the promotion of science."

Kankah the Indian, says Prof. H. Wilson, was very celebrated in the history of Arabian astronomy. He says that it is certain that the astronomy and medicine of the Hindus were cultivated anteriorly to those of the Greeks, by the Arabs of the eighth century. "It is clear that the Charaka, the Susruta, the treatises called Nidán on diagnosis, and others on poisons, diseases of women, and therapeutics, all familiar to Hindu science, were translated and studied by the Arabs in the days of Haroun and Mansur, either from the originals, or translations made at a still earlier period into the language of Persia."¹

We may conveniently mention here the famous Jew of Spain, Rabbi Moses ben Maimon, or Maimonides (died 1198), a native of Cordova, who was profoundly learned in mathematics, medicine, and other arts. He retired to Egypt, where he wrote books on medicine, which were much read. He advised his patients never to sleep in the daytime, and at night only on the side. He recommended them not to retire to rest till three to four hours after supper.²

Medical etiquette was rather strict. "Operations performed by the hand, such as venesection, cauterization, and incision of arteries, are not becoming a physician of respectability and consideration. They are suitable for the physician's assistants only. These servants of the physician should also do other operations, such as incision of the eyelids, removing the veins in the white of the eye, and the removal of cataract. For an honourable physician nothing further is becoming than to impart to the patient advice with reference to food and medi-

¹ *Journal of the Royal Asiatic Society*, vol. vi. p. 119.

² *Baas, Hist. Med.*, p. 233.

cine. Far be it from him to practise any operation with the hand. So say we !”¹

Dentistry was practised, but it was considered by the Arabs, as by the Greek and Roman doctors, a very inferior branch of the profession, and was, for the most part, as with ourselves, till very recently relegated to uneducated persons. Midwifery also was, to a great extent, neglected by the higher class of physicians. The Arabian faculty esteemed most highly medicine proper, though pharmacy and *materia medica* were especially studied. The professors were paid by the State, and handsomely as a rule. Their text books were the works of the Greek physicians, especially Hippocrates and Galen. A sort of matriculation examination was required before a student could enter the great schools, and he was subjected to professional examinations (not very severe, presumably) before he was permitted to practise. The Arabian physicians were usually men of the highest culture ; not only were they men of science, but of philosophy and literature also. Great mystery was combined with Arabian medical practice ; astrology was the handmaid of medicine, and charms entered largely into therapeutics. The physicians wrote prescriptions with purgative ink ; so that “take this !” was meant literally when the doctor gave the patient his prescription. It had to be swallowed in *duè* form.

Although the great civilizations of the East date their origins from a period far more remote than those of the West, they have lagged far behind the West in progress. Professor Freeman defines European society as progressive, legal, monogamous, and, for the last fifteen hundred years, a Christian society ; the East he defines as stationary, arbitrary, polygamous, and Mahometan.¹ The dominant note of Oriental history is sameness ; a monotony which enables us to read in the story of to-day that which took place amongst Eastern peoples a thousand years ago. The history of a single city of Europe is of infinitely greater interest to the student of humanity and the history of civilization than that of a whole nation of the East. The history of Florence alone is of greater importance, from this point of view, than that of all China. There is, however, one marvellous history, that of Mahomet and his creed, which excels in interest that of any other man of the Oriental nations. “Nowhere,” says Freeman, “in the history of the world can we directly trace such mighty effects to the personal agency of a single mortal.”²

¹ Arabic writer, quoted by Baas, *Hist. Med.*, p. 221.

² Freeman's *Saracens*, p. 4.

³ *Ibid.*, p. 6.

CHAPTER III.

RISE OF THE MONASTERIES.

Alchemy the parent of Chemistry.

LEARNING in Europe was greatly advanced by the foundation of the famous monastery of Monte Cassino, by ST. BENEDICT, near Naples, in the year 529. The religious houses of this order, of which Monte Cassino was the parent, were the means of sheltering in those troublous times the men who devoted themselves to literature and secular learning, as well as to the severities of the religious life. In these peaceful abodes men learned how to make the desert blossom as the rose, agriculture and other civilizing occupations were studied and successfully practised, and from the sixth century to the ninth such medical knowledge as existed in Europe chiefly emanated from these abodes of piety, industry, and temperance. Missionaries issued from them to convert and civilize the nations; and wherever the monks went, they acted as the healers of the sick, as well as the spiritual advisers of the sinner. Everywhere they cultivated medicinal plants, whose properties they learned to understand; by interchange of thought and comparison of opinions every monastery, with its constant going and coming of the brethren, became an exchange of knowledge: the science of Spain was carried to Italy, that of Italy to France and England, which in their turn contributed to the general stock of information such items of knowledge as they possessed. "If science," says Schlegel,¹ "was then of a very limited range, it was still quite proportioned to the exigencies and intellectual cultivation of the age; for mankind cannot transcend all the degrees of civilization by a single bound, but must mount slowly and in succession its various grades."

ALCUIN (735-804), the great reviver of learning in the eighth century, was an ecclesiastic who instructed Charlemagne and his family in rhetoric, logic, mathematics, and divinity. "France," says a great writer, "is indebted to Alcuin for all the polite learning it boasted in that and the following ages. The universities of Paris, Tours, Fulden, Soissons, and many others, owe to him their origin and increase." By

¹ *Philosophy of History*, p. 342.

the benefits he obtained from Charlemagne for the Christian schools which he founded, education began to revive in Europe, and by the Emperor's command schools were established in every convent and cathedral throughout his vast empire, wherein not clerics alone, but the sons of the nobility who were destined for a secular life, could receive the highest education at that time attainable. "The monasteries became a kind of fortress in which civilization sheltered itself under the banner of some saint; the culture of high intelligence was preserved there, and philosophic truth was reborn there of religious truth. Political truth, or liberty, found an exponent and a defender in the monk, who searched into everything, said everything, and feared nothing. Without the inviolability and the leisure of the cloister, the books and the languages of the ancient world would never have been transmitted to us, and the chain which connects the past with the present would have been snapped. Astronomy, arithmetic, geometry, civil law, physic and medicine, the profane authors, grammar, and the *belles lettres*, all the arts, had a succession of professors uninterrupted from the first days of Clovis down to the age when the universities, themselves religious foundations, brought science forth from the monasteries. To establish this fact it is enough to name Alcuin, Anghilbert, Eginhard, Treggan, Loup de Terrières, Eric d'Auxerre, Hincmar, Odo of Clugny, Cherbert, Abbon, Fulbert."¹

THE ORIGIN OF CHEMISTRY.

The great importance of the science of chemistry in its connection with that of medicine, compels some allusion to its origin. Without question alchemy was the forerunner of chemistry. Beginning in the search for the means of transmuting base metals into gold, it ultimately endowed us with a far more precious knowledge—the art of preparing many of our most valuable medicines.

The first authentic account of alchemy is an edict of Diocletian about A.D. 300, in which a diligent search is ordered to be made in Egypt for all the ancient books which treated of the art of making gold and silver, that they might be destroyed. This shows that the pursuit must have been of great antiquity. Fable credits Solomon, Pythagoras, and Hermes amongst its adepts. We find nothing more about it till its revival by the Arabians some five or six hundred years later.²

The word *Alchemy* is mentioned for the first time by the Byzantines. The art of transmuting metals under the name of *Chemia*, is first spoken of by Suidas, who wrote in the tenth century. The Byzantines began

¹ Chateaubriand, *Analyse de l'Histoire de France, Seconde Race*.

² Goodwin; *Lives of the Necromancers*, pp. 29, 30.

to make chemical experiments about the seventh century; all the books they quote were attributed to Hermes. What is known as the Hermetic philosophy was synonymous with alchemy, but the books were really the work of the monks of the period.¹

The earliest works on alchemy which we possess are those of Geber of Seville, who lived probably about the eighth or ninth century. His works were entitled *Of the Search of Perfection, Of the Sum of Perfection, Of the Invention of Verity*. He divided metals into the more or less perfect, gold the most perfect, silver the next, etc. His aim was to convert inferior metals into gold; that which should turn base metals into gold would be also a universal medicine, would cure or prevent diseases, prolong life, and make the body beautiful and strong. The philosopher's stone would embrace in itself all perfections. Alchemy led to chemistry; it is even declared by some to have been the mother of chemistry. Some have thought that without the hope of making gold and other precious things, men would never have been inspired to investigate the secrets of nature and sustained in the arduous and often dangerous work of the chemist. But this is to take far too low a view of the scientific mind in all ages. The search for truth, the passion for investigating and interrogating nature has happily never wholly depended upon mercenary motives, and men have devoted their lives as ardently to scientific researches, by which they could never have hoped to gain a single penny, as did those alchemists of old, who bent over their crucibles in the vain search for the perfect magistry.²

Gibbon says,³ "The science of chemistry owes its origin and improvement to the industry of the Saracens. They first invented and named the alembic for the purposes of distillation, analysed the substances of the three kingdoms of nature, tried the distinction and affinities of alkalis and acids, and converted the poisonous minerals into soft and salutary medicines." Gibbon somewhat exaggerates. Analysis and affinity were discovered at a much later period. It was Europeans in the sixteenth and seventeenth centuries who advanced chemical science towards its present high position.

NONNUS (10th century) wrote "a compendium of the whole art of medicine," in 290 chapters. It is a mere compilation, and the author is only worthy of remembrance in medical history as the earliest Greek medical writer who mentions distilled rose-water, an article originally derived from the Arabians.

¹ Cap, *Études Biographiques*, Ser. ii. p. 326.

² See Whewell's *Hist. Induct. Sciences*, vol. i. p. 305.

³ *Decline and Fall*.

CHAPTER IV.

RISE OF THE UNIVERSITIES.

School of Montpellier.—Divorce of Medicine from Surgery.

AN important era in the history of medicine in Europe was the rise of the universities. It is not possible to fix precisely the date of the foundation of these great centres of learning, but we may sufficiently for our purpose fix the twelfth century as approximately the period in which Bologna, Montpellier, Oxford, Cambridge, and Paris were regularly established.

Cambridge University took its rise in all probability somewhere in the twelfth century, "originating in an effort on the part of the monks of Ely to render a position of some military importance also a place of education."¹

The most ancient universities in Europe are said to be those of Bologna, Oxford, Cambridge, Paris, and Salamanca. The following dates are approximate: Bologna, 1116; Oxford, 879; Cambridge, twelfth century; Cordova, 968; Paris, 792, renovated 1200; Palenza, 1209, removed to Salamanca, 1249. * Salamanca was founded 1239; Naples, 1224; Montpellier, 1289; Rome, 1243; Salerno, 1233.

The University of Bologna was famous as a school of law and letters so early as the twelfth century. In the next it became distinguished for its medical teaching. It was in such perfection that its professors were classed as physicians, surgeons, barber surgeons, and oculists. But still, anatomy, except in so far as it assisted the surgeon, was neglected. Roger, Roland, Jamerio, Bruno, and Lanfranc, seemed alone to have paid much attention to it, and then only to borrow from Galen.² The medical faculty became celebrated after 1280, when Thaddeus Florentinus was a teacher in it.

The University of Padua was founded 1179.

In 1268 it possessed three teachers of medicine and the same number of teachers of natural science.

Montpellier was the first great rival of Salerno as a school of medicine. Its charter dates from 1229.

Medicine was not taught at Paris during the twelfth century. John

¹ Mullinger's *University of Cambridge*, p. 334.

² As Haydn gives them.

³ *Ency. Brit.*, art. "Anatomy."

of Salisbury, writing in the year 1160, says that those who desired to study medicine had to go either to Salerno or Montpellier. But, says Laurie,¹ physicians of eminence are recorded as having taught at Paris after this date, and the subject was formally lectured upon not later than 1200. Degrees or licences in physic were granted in 1231.

The University of Naples was founded in 1224, by the Emperor Frederick II. Originally all the faculties were represented, but in 1231 medicine was forbidden, as by Imperial decree it could only be taught at Salerno.

The University of Prague was founded in 1348 by Charles IV. of Bohemia, as a complete university from the outset.

SCHOOL OF MONTPELLIER.

The origin of the medical school of Montpellier is obscure. Probably it originated in the tenth century, and there is little doubt that the Jews of Spain were concerned in its foundation. The Arabs found firm friends in the Jewish people of Spain, their monotheism proving a bond of union which ensured the sympathy of each, and the school of Montpellier became the rallying-point of Arabian and Jewish learning. Europe has rendered too little gratitude for the intellectual blessings bestowed on her by the Hebrews. A nation of Eastern origin, and having very extensive relations with Eastern commerce, the Israelites acted as the medium for transmitting the intellectual and material wealth of Eastern countries to Western peoples. "We owe to them much of our acquaintance with Saracenic medicine and pharmacy. They translated for us Arabic books, and they introduced to Western markets the precious drugs of far-distant Eastern lands. The school of medicine of Montpellier first became famous in the beginning of the twelfth century. Averroism prevailed, and a practical empirical spirit distinguished the school from the dogmatic and scholastic teaching of other universities. It has been attempted to show that a Jewish doctor from Narbonne first taught medicine at Montpellier. When Benjamin of Tudela went to the university in 1160, he says that he found many Jews amongst the inhabitants. Adalbert, Bishop of Mayence, went to Montpellier in 1137 to learn medicine from the doctors, "that he might understand the deeply hidden meaning of things." In 1153 the Archbishop of Lyons went there for treatment, and John of Salisbury said that medicine was to be acquired either at Salerno or Montpellier. Men called the school the "Fountain of Medical Wisdom," and it soon rose to great importance on account of its unlimited freedom in teaching.²

¹ *Rise and Constitution of Universities*, p. 157.

² Puschmann's *Hist. Med. Educ.*, p. 214.

Cardinal Conrad made a law that no one should act as a teacher of medicine in the university who had not been examined in it and received a licence to teach. In 1230 it was ordered that no one should practise medicine until he had been examined, and that to the satisfaction of two masters in medical science chosen as examiners by the bishop. To engage in practice without the certificate of the examiners and the bishop was to incur the sentence of excommunication.¹ Surgeons, however, were not compelled to undergo examination. Medicine flourished at Montpellier with great independence; it was not merged with the other faculties, and it was not subjected to clerical influences.² Even Louis XIV. was obliged to withdraw a decree ordering the union of the medical with the other faculties.³

Every student was compelled (1308) to attend medical lectures for at least five years, and to practise medicine for eight months, before being allowed to graduate. In 1350 the degree of Magister had to be taken in addition.⁴

The most brilliant period in the history of the medical school of Montpellier was that of the thirteenth and fourteenth centuries. Its fame was sounded throughout the world. From all parts invalids went to Montpellier to seek its famous physicians. King John of Bohemia, and the Bishop of Hereford, were of the number.

DIVORCE OF MEDICINE FROM SURGERY.

Surgery became separated from medicine in Alexandria, but it was not until the middle of the twelfth century that the ecclesiastics were restrained from undertaking any bloody operations. The universities rejected surgery under the pretext, "*ecclesia abhorret a sanguine*" (the church abhors the shedding of blood). It is therefore to this epoch, as Mr. Cooper says,⁵ that we must refer the true separation of medicine from surgery; the latter was entirely abandoned to the ignorant laity.

At the Council of Tours, A.D. 1163, the practice of surgery was denounced as unfit for the hands of priests and men of literature, the consequence being that the surgeon became little better than a sort of professional servant to the physician, the latter not only having the sole privilege of prescribing internal medicines, but even that of judging and directing when surgical operations should be performed. Then the subordinate surgeon was only called upon to execute with his knife, or

¹ Puschmann's *Hist. Med. Educ.*, p. 216.

² *Ibid.*, p. 217.

³ *Ibid.* See also Dubouché, "Documents pour servir à l'histoire de l'université de médecine de Montpellier," in the *Gaz. hebdomadaire des sciences med. de Montpellier*, 1887, No. 4.

⁴ *Ibid.*, p. 218.

⁵ *Surgical Dict.*, art. "Surgery."

his hand, duties which the more exalted physician did not choose to undertake ; and, in fact, he visited the patient, did what was required to be done, and took his leave of the case, altogether under the orders of his master.¹

JOHN OF SALISBURY, one of the most learned men of the twelfth century, gives an account of the state of medicine in that period, which is very suggestive. "The professors of the theory of medicine are very communicative ; they will tell you all they know, and, perhaps, out of their great kindness a little more. From them you may learn the nature of all things, the causes of sickness and of health, how to banish the one and how to preserve the other ; for they can do both at pleasure. They will describe to you minutely the origin, the beginning, the progress, and the cure of all diseases. In a word, when I hear them harangue, I am charmed ; I think them not inferior to Mercury or *Æsculapius*, and almost persuade myself that they can raise the dead. There is only one thing that makes me hesitate. Their theories are as directly opposite to one another as light and darkness. When I reflect on this, I am a little staggered. Two contradictory propositions cannot both be true. But what shall I say of the practical physicians ? I must say nothing amiss of them. It pleaseth God, for the punishment of my sins, to suffer me to fall too frequently into their hands. They must be soothed, and not exasperated. That I may not be treated roughly in my next illness, I dare hardly allow myself to think in secret what others speak aloud."

In another work, however, the writer delivers himself with greater freedom. Speaking of newly-fledged medicos, he says : "They soon return from college, full of flimsy theories, to practise what they have learned. Galen and Hippocrates are continually in their mouths. They speak aphorisms on every subject, and make their hearers stare at their long, unknown, and high-sounding words. The good people believe that they can do anything, because they pretend to all things. They have only two maxims which they never violate : never mind the poor, never refuse money from the rich."

ROBERT OF GLOUCESTER² does not write very highly of the skill in surgery possessed by the Anglo-Normans. Speaking of the Duke of Austria, who took King Richard the First prisoner, his verses import that when "he fell off from his horse and sorely bruised his foot, his physicians declared that if it was not immediately smitten off, he would die ; but none would undertake the performance of the operation ; till the Duke took a sharp axe, and bid the chamberlain strike it off, and he smote

¹ Cooper's *Surgical Dictionary*, art. "Surgery."

² *In vit. Ric. pri.*, p. 490.

thrice ere¹ he could do it, putting the Duke to most horrid torture. And Holinshed tells us that in the time of Henry the Third there lived one Richard, surnamed Medicus, 'a most learned physician, and no less expert in philosophy and mathematics;' but makes not the least mention of surgery. Also some authors have attributed the death of Richard the First (wounded in the shoulder at the Castle of Chalezun), to the unskilfulness of those who had the care of the wound, and not from the quarrel's being poisoned, as others have insinuated."¹

The university title of Doctor was not known in England before the reign of Henry II.²

RICHARD FITZ-NIGEL, Bishop of London, was apothecary to Henry II. Many bishops and dignitaries of the Church were physicians to kings and princes.³ Most of the practitioners of medicine and teachers of physic were churchmen, either priests or monks.

ST. HILDEGARD (1098-1179), Abbess of Rupertsberg, near Bingen on the Rhine, was a famous physician and student of nature, who wrote a treatise on *Materia Medica*. Her pharmacy was in advance of her time, and to this eminent lady physician we are indebted for the attempts to disguise the nastiness of physic; she enveloped the remedy in flour, which was then made into pancakes and eaten.⁴ Meyer says that her work entitled *Physica* "is a treatise on *Materia Medica*, unmistakably founded on popular traditions." Her visions and revelations concerning physical and medical questions are contained in her work "*Divinorum operum simplicis hominis liber*." She was a true reformer within the Church, and her pure life was singularly devoted and unselfish; she was, in fact, a Woman Physician, who should be the patron saint of our lady doctors.

¹ Strutt's *Horda Angel-Cynnan*, vol. ii. p. 26.

² Wood, *Hist. Univ. of Oxford*, vol. i. p. 62.

³ Henry, *Hist. Great Britain*, vol. vi. p. 114.

⁴ Jessen.

CHAPTER V.

THE SCHOOL OF SALERNO.

The Monks of Monte Cassino.—Clerical Influence at Salerno.—Charlemagne.—Arabian Medicine gradually supplanted the Græco-Latin Science.—Constantine the Carthaginian.—Archimattæus.—Trotula.—Anatomy of the Pig.—Pharmacopœias.—The Four Masters.—Roger and Rolando.—The Emperor Frederick.

THE connecting link between the ancient and the modern medicine was the school of Salerno. It is true that Hippocrates and Galen in Arabian costume re-entered Europe after a long absence in the East, when the Moors occupied a great part of Spain; but great as was this Saracenic influence on medical science, it was not to be compared with the powerful and permanent influence secured by the native growth of medical science which sprung up on Italian soil.

The origin of this celebrated mediæval institution is involved in obscurity; it has been generally understood to have sprung from the monastery of Monte Cassino, founded by St. Benedict in the sixth century. St. Benedict probably possessed some medical knowledge, and it is certain that many of his order did. The Benedictines had houses in La Cava and Salerno. The legends of the wonderful cures wrought by St. Benedict would naturally attract crowds of sufferers to the doors of the learned and charitable monks. There would consequently be abundant opportunities for the study of diseases and their remedies; and though there was probably little enough of what could strictly be called scientific medical practice, there was doubtless as much effort to cure or mitigate suffering as was consistent with the rule of a learned religious order. Some writers think that the famous school of Salerno existed as early as the seventh century, that Greek thought and traditions lingered there long after they had ceased to exist in other parts of Italy; and they argue that as it was, as is now clearly shown, a purely secular institution, it was independent in origin and constitution of any monastic connection. Others maintain that it was founded by the Arabs; but, as Daremberg points out,¹ the first invasions of the Saracens in Sicily and Italy, dating from the middle of the ninth

¹ *L'École de Salerne.*

century, had for their objects simply pillage and slaughter ; and there is nothing whatever to show in the whole course of their devastations the slightest desire to found literary or scientific institutions. The Saracens never sojourned at Salerno, and before the end of the eleventh century there is no trace of Arabian medicine in the works written by the great teachers of Salerno. It is as unnecessary as it is unjust to seek any other origin for the Salernian school than that of the Benedictines of Monte Cassino.¹ Bede, Cuthbert, Auperth, and Paul were brought up at that monastery, and we know that medicine was always cultivated to a certain extent in those ancient abodes of learning and religion. As Balmez says concerning Monte Cassino,² "the sons of the most illustrious families of the empire are seen to come from all parts to that monastery ; some with the intention of remaining there for ever, others to receive a good education, and some to carry back to the world a recollection of the serious inspirations which the holy founder had received at Subiaco." It seems, therefore, that the origin of the medical school of Salerno was somewhat on this wise: a lay spirit of science was developed, and many young men having no aptitude for the monastic life, but desirous to devote themselves entirely to the healing art as an honourable and lucrative profession, doubtless desired to form themselves into a society or school for this end ; they would receive encouragement from their more liberal and enlightened monastic teachers to settle in a beautiful and healthy resort of invalids such as Salerno had long been considered, and to pursue their medical studies under the supervision of the men most competent to instruct them. Dr. Puschmann, quoting from S. de Renzi,³ states that in documents of the years 848 and 855, JOSEPH and JOSHUA are named as doctors practising there. The Lombard REGENIFRID lived there in the year 900 ; he was physician to Prince WAIMAR of Salerno. Fifty years later the doctor PETRUS was raised to the bishopric of Salerno. Many doctors of this time were clerics, but there were also many who were Jews.⁴ This ancient people, hated and persecuted in every other relation of life, were popular as physicians in the Middle Ages. The books studied and expounded were Hippocrates and Galen, which were translated into Latin before A.D. 560.⁵

Its cosmopolitan sentiments probably gave rise to the story that is told in an ancient Salernian chronicle, rediscovered by S. de Renzi, to

¹ Laurie, *Rise, etc., of Universities*, p. 112.

² *European Civilization*, p. 216.

³ *Storia docum. della scuola med. di Salerno*, p. 157, et seq.

⁴ S. de Renzi, *Collectio Salernitana*, iii. 325.

⁵ Laurie's *Rise, etc., of Universities*, p. 112.

the effect that the school was founded by four doctors ; namely, the Jewish Rabbi ELINUS, the Greek PONTUS, the Saracen ADALA, and a native of Salerno, who each lectured in his native tongue.¹

It is said that Charlemagne in 802 A.D. greatly encouraged this Salerno school by ordering Greek works of medicine to be translated from the Arabic into Latin. Salernum, in consequence of the medical and public instructions given by the monks in the neighbouring monastery, became known as a *civitas Hippocratica*.²

BERTHARIUS, abbot from 856, was a very learned man ; and it is stated that there are still in existence two manuscripts of his which contain a collection of hygienic and medicinal rules and prescriptions.³

ALPHANUS (SECUNDUS) (flourished about 1050), a distinguished monastic philosopher and theologian, wrote a treatise on *The Union of the Soul and Body*, and another on *The Four Humours*. He carried with him, when he removed to Florence, many manuscripts and a great quantity of medicines. During the eleventh century Salerno rose to great importance, not only from its situation as a port from which the Crusaders departed to the wars, but from the daily widening influence of its medical school.

PETROCELLUS wrote on the practice of medicine about 1035 ; he was the author of the *Compendium of Medicine*. GARIOPONTUS (died before 1056) wrote a work entitled *Passionarius Galeni*. These are the two most ancient works of this school which have reached our times, says Daremberg. The medicine of Salerno before the year 1050 was a combination of methodism in its doctrines and of Galenisms in its prescriptions.⁴ We find, says Baas,⁵ in Gariopontus the first intimation of the inhalation of narcotic vapours in medicine, while the ancients could only produce anæsthesia by compression and the internal use of such drugs as mandragora and belladonna. Herodotus says ⁶ that the Scythians used the vapour of hemp seed to intoxicate themselves by inhaling it, but this was not for medicinal purposes.

DESIDERIUS was abbot of Salerno, and afterwards became Pope Victor III. in 1085. He is said to have been *medicinæ peritissimus*.⁷

About this time flourished CONSTANTINE, the Carthaginian Christian, whose fame was European, and who finally placed Salerno in the front as a great and specialized public school of medicine. He travelled far in the East, and is said to have learned mathematics, necromancy, and the sciences in Babylon. He visited India and Egypt, and when he returned to Carthage he was the most learned man of his time in all

¹ See Puschmann's *Hist. Med.*, p. 199.

² *Ibid.* ³ *Ibid.*, p. 113.

⁴ Daremberg, *L'École de Salerne*.

⁵ *Hist. Med.*, p. 262.

⁶ IV. 75.

⁷ Laurie, *Rise, etc., of Universities*, p. 113.

that related to medical science. Naturally he was suspected of witchcraft, and he fled for refuge to Salerno. Robert Guiscard the Norman held him in the highest favour, and under his protection he published many works of medicine of his own, and made many translations of medical books from the Arabic. He ultimately retired to the monastery of Monte Cassino, where he died in 1087. We may safely date the establishment of the splendid reputation of the Salerno school from the time of his settlement there.¹

Daremborg does not allow that the influence of Constantine was so great as is generally supposed. He points out that it was not in the middle of the eleventh but at the end of the twelfth century that Arabian medicine was substituted in the school of Salerno, as in the West generally, for the Græco-Latin. And it is perfectly true that if we examine the medical writings of this period we find very little progress from the times of the ancients, except in pharmacy and the knowledge of drugs and their properties. Daremborg's researches go to prove that many of Constantine's works, previously supposed to have been original, were but cunningly disguised translations from the Arabic. By altering the phraseology, and suppressing such proper names as would have led to suspicion of the origin of his treatises, he obtained credit for a great mass of literary work which had really another source.²

JEAN AFFLACIUS, a disciple of Constantine, wrote *The Golden Book on the Treatment of Diseases*, and another work *On the Treatment of Fevers*.³ Daremborg says that these works of Afflacijs show no more traces of Arabian influence than the works of his contemporaries.

He advised that the air of the sick-room should be kept cool by the evaporation of water, and he administered iron in enlargement of the spleen.

ARCHIMATTHÆUS lived soon after Constantine; his name occurs about the year 1100 as the author of two important books on medicine, *The Instruction of the Physician* and *The Practice*. The former work is occupied with advice, sometimes exaggerated, on the dignity of the healing art; and though it appears childish enough to our more sophisticated age, it is not without evidence of a desire to instruct the doctor in all that relates to the welfare of the patient and the dangers incurred by any deviation from the strictest code of professional rectitude. It is unfortunately, however, blended with so much that is crafty and sly that it approaches in some directions very closely to

¹ Laurie's *Rise, etc., of the Universities*, pp. 113, 114.

² Daremborg, *L'École de Salerne*, p. 146.

³ *Collect. Salern.*, t. ii. pp. 737-768.

charlatanism. Archimathæus very minutely instructs the doctor how to comport himself when called to visit a patient.¹

He should place himself under the protection of God and under the care of the angel who accompanied Tobias. On the way to the patient's home he should take care to learn from the messenger sent for him the state of the patient, so that he may be, on reaching the bedside, well posted in all that concerns the case; then if, after he has examined the urine and the state of the pulse, he is not able to make an accurate diagnosis, he will at least be able, thanks to his previous information, to impress the patient with the conviction that he completely understands his case, and so will gain his confidence. The author considers it very important that the sick person, before the arrival of the physician, should send for a priest to hear his confession, or at least promise to do so; for if the doctor were to see reason to suggest this himself, it would give the patient cause to suppose that his case was hopeless. "Upon entering the house of his patient, the physician should salute all with a grave and modest air, not exhibiting any eagerness, but seating himself to take breath; he should praise the beauty of the situation,² the good arrangements of the house, the generosity of the family; by this means he wins the good opinion of the household, and gives the sick person time to recover himself a little." After the most careful directions as to the examination of the patient, the author takes the doctor from the house with as much artfulness as he has brought him hither. He is to promise the patient a good recovery, but privately to the friends he is to explain that the illness is a very serious one: "if he recovers, your reputation is increased; if he succumbs, people will not fail to remember that you foresaw the fatal termination of the disease." If he is asked to dine, "as is the custom," he is to show himself neither indiscreet nor over-nice. If the table is delicate, he is not to become absorbed in its pleasures, but to leave the table every now and then to see how the patient progresses, so as to show that he has not been forgotten while the doctor was feasting. He is honestly to demand his fee, and then go in peace, his heart content and his purse full. In the *Practice* of the same author, we have, says Daremberg, a true *Clinic*, the first work of the kind since the *Epidemics* of Hippocrates; it exhibits a skilful practitioner, a good observer, and a bold therapist. The doctrines and methods are those of Hippo-

¹ *Anonymi Salernitani de adventu medici ad ægrotum*. Ed. A. G. E. Th. Henschel, Vratist., 1850. De Renzi, *Collect. Salern.*, ii. 74-81, v. 333-349. Puschmann, *Hist. Med.*, p. 203. Daremberg, *L'École de Salerne*, p. 148.

² The whole coast between Salerno and Amalfi and the surrounding parts are some of the loveliest places in Italy.

crates and Galen, but not of the Arabs. It is also interesting as proving that at this period the distinction was established between the true physicians and the common physicians, or the specialists and the general practitioners or physician-apothecaries.

A remarkable and interesting feature in the history of the school of Salerno is the fact that some of its most famous professors of medicine were ladies. About the year 1059, TROTULA, a female physician, wrote a well-known book on the diseases of women, and their treatment before, during, and after labour. She discusses all branches of pathology, even of the male sexual organs.¹ It was supposed that she was the wife of John Platearius the elder, and that she belonged to the noble family of Roger. Her person and name were at one time considered legend and myth, but M. Renzi's investigations have proved her to be sufficiently historical. Trotula lived at Salerno, as is shown by the *Compendium Salernitanum*, and she practised in that city, as is clear from her work on the diseases of women. Her name occurs variously as Trotula, Trotta, and Trocta.²

ABELLA wrote a treatise *De Natura Seminis Humani*; she was a colleague of Trotula's. COSTANZA CALENDIA was the daughter of the principal of the medical school, and was distinguished both for her beauty and her talents; she left no writings. MERCURIADIS and REBECCA GUARNA were doctresses of the fifteenth century. They wrote chiefly on midwifery and diseases of women.³

COPHO, in the early part of the twelfth century, was an anatomist, and probably a Jew; he wrote the *Anatomy of the Pig*. Students were instructed in dissections by operating on dead animals when, as in those days, human bodies were not accessible. The pig was killed by severing the vessels of the neck, and was then hung up by the hind legs, and when the blood had escaped the body was used for teaching purposes; it was not dissected in the modern sense at all, the examination consisting merely in observation of the great cavities and the vital organs, according to the suggestions of Galen and the old anatomists.⁴

NICHOLAS PRÆPOSITUS, about 1140, was the president of the school, and wrote a famous book called the *Antidotarium*—a Pharmacopœia as we should call it. This book of recipes was compiled from the works of the Arabian doctors Mesues, Avicenna, Actuarius, Nicolaus Myrepsus, as well as from Galen. It is interesting as giving the forms which the compounders of the prescriptions were sworn on their oath to observe;

¹ Puschmann, *Hist. Med. Education*, p. 201.

² Daremberg, *L'École de Salerne*.

³ See Dr. Haeser's *Lehrbuch der Geschichte der Medicin*, p. 290.

⁴ Puschmann, *Hist. Med. Education*, p. 203.

they promised to make up all their potions, syrups, etc., "*secundum prædictam formam*," and they further promised that their drugs should be fresh and sufficient. It shows also that there was a habit of writing a prescription when a patient was visited; this, it seems, was a custom which originated with the Arabian physicians.¹

Nicholas was also the author, says Dr. Baas,² of a work called "*Quid pro Quo*," which was a list of drugs which were equivalent to other drugs, and might be used as substitutes for each other in case of either running short. Dr. Baas says our expression "*Quid pro Quo*" originated from this.

The writings of Bartholomæus and of Copho the Younger (between 1100 and 1120), says Daremberg, are of great interest in the history of medicine; they show how great was the freedom of spirit which existed at Salerno at this time. Copho described certain diseases which were not referred to in the works of other writers of Salerno; for example, ulceration of the palate and trachea, polypi, scrofulous tumours of the throat, condylomata, etc. Bartholomæus and Copho also held certain original ideas as to the classification of fevers. Copho distinguished between medicine for the rich and for the poor: the rich are delicate, and must be cured agreeably; the poor wish only to be cured at as little cost as possible. Thus the nobles must be purged with finely powdered rhubarb, the poor, with a decoction of mirobalanum, sweetened or not. Naturally the more precious drugs would be used for the wealthy, and probably the poor, who could not afford the complicated and terrible confections of mediæval pharmacy, might have congratulated themselves on being treated with a few simples instead of the precious messes which the wealthy had to swallow.

JOHANNES PLATEARIUS deserves notice as having been the inventor of the term "*Cataracta*," in place of the ancient Egyptian "*ascent*" and the Greek "*hypochosis*," in classical Latin "*suffusio humorum*" (Hirsch).³

MATTHÆUS PLATEARIUS was the son of the above; he composed a *Practica Brevis* and other books on medicine; it is not certain at what precise date they flourished.

ÆGIDIUS "*CORBOLENSIS*," canon of Paris, physician to Philip Augustus, king of France (1165-1213), wrote a poem on the decline of Salerno as a medical school; he describes the doctors as caring nothing for books which were not full of recipes, and the professors as merely beardless boys.

¹ Meryon, *History of Medicine*, p. 162. See also Beckmann's *Hist. of Inventions*, art. "*Apothecaries*."

² Baas, *Hist. Med.*, p. 263.

³ Note in Baas' *Hist. Med.*, p. 263.

The famous but somewhat mysterious "Four Masters" were commentators on the surgery of Roger and Roland.

MUSANDINUS wrote on the diet of the sick; bleeding was recommended for the want of appetite in convalescents, and patients were rather to be purged to death than permitted to die constipated.

BERNARD THE PROVINCIAL recommends wine for the delicate stomachs of bishops; he said they could not bear emetics unless they were administered on a full stomach. His treatise was written between the years 1150 and 1160. He did much to simplify the *materia medica* of his time, advising the poor not to waste their means on costly foreign drugs, but to gather simples from the fields. It is interesting to find in the thirteenth century police regulations which required in many cities of Italy that physicians should inspect druggists' shops and see that their medicines were pure and fresh. Pharmacy, it seems, was already becoming divorced from medical practice.¹

In the middle of the twelfth century there appeared a didactic poem called *Schola Salernitana*, *Flos Medicinæ*, or *Regimen Sanitatis*, or *Regimen Virile*. This celebrated work went through hundreds of editions.²

Dr. Handerson, in his translation of Baas' *History of Medicine*, says it had other titles than those given above, as *Medicina Salernitana*, *De Conservanda Bona Valetudine*, *Liliūm Sanitatis*, *Compendium Salernitanum*, etc. The work was for centuries the physician's *vade mecum*. It is not known who was the author; originally it was put forth as emanating from "the whole school of Salerno to the king of England," namely, Robert, son of William the Conqueror, who was cured of a wound at Salerno in 1101. The poem consisted of some two thousand lines. Dr. Handerson gives the following translation of a few lines of this curious work :—

"Salerno's school in conclave high unites,
To counsel England's king, and thus indites :
If thou to health and vigour would'st attain,
Shun mighty cares, all anger deem profane ;
From heavy suppers and much wine abstain ;
Nor trivial count it, after pompous fare,
To rise from table and to take the air ;
Shun idle noonday slumbers, nor delay
The urgent calls of nature to obey :
These rules if thou wilt follow to the end,
Thy life to greater length thou may'st extend."

¹ Daremberg, *L'École de Salerne*.

² To be precise, "M. Baudry de Balzac computes from 1474 to 1846, 240 editions of *The School of Salerno*. It was translated into French, German, English, Breton, Italian, Spanish, Polish, Provençal, Bohemian, Hebrew, and Persian. The number of manuscripts which contain this poem is more than 150." (Daremberg, *L'École de Salerne*.)

It has been translated into English by Thomas Paynell in 1530, by John Harrington in 1607, and by Alexander Croke in 1830.

The poem is a composite work, and its form was doubtless adopted for facility of committing to memory an important text-book of health rules.

ROGER, or RUGGIERO, known as Roger of Parma or of Palermo, lived about 1210, was a student, and for a long time a professor in Salerno. He was a celebrated surgeon, who practised trepanning of the sternum and stitching of the intestine. He was the first to describe a case of hernia pulmonis, to use the term seton, and to prescribe the internal use of sea-sponge for the removal of bronchocele.¹ He knew how to arrest hæmorrhage by styptics, sutures, and ligatures.

He was the earliest special writer on surgery in Italy.² His later editor ROLANDO exhibits an acquaintance with surgery, which shows that, although the art had not been previously written upon in Italy, it was very well understood at Salerno. De Renzi says that some of the operations described are trephining, the removal of polypi from the nose, resection of the lower jaw, the operation for hernia and lithotomy. Malignant tumours of the rectum and uterus are referred to.³

Salerno was the first school in Europe in which regular diplomas in medicine were granted to students who had been duly instructed and had passed an examination in accordance with the requirements of the legal authorities. The great patron of Salerno, Frederick II., in the year 1240 confirmed the law of King Roger, passed in the year 1137, or as some say in 1140, with reference to licences to practise medicine. That ancient enactment was that, "Whoever from this time forth desires to practise medicine must present himself before our officials and judges, and be subject to their decision. Any one audacious enough to neglect this shall be punished by imprisonment and confiscation of goods. This decree has for its object the protection of the subjects of our kingdom from the dangers arising from the ignorance of practitioners."⁴

Frederick's law was: "Since it is possible for a man to understand medical science, only if he has previously learnt something of logic, we ordain that no one shall be permitted to study medicine until he has given his attention to logic for three years. After these three years he may, if he wishes, proceed to the study of medicine. In this study

¹ Iodine was not known at this time; and the virtue of the sponge, if any, was doubtless due to the iodine it contained.

² Baas, *Hist. Med.*, p. 299.

³ Puschmann, *Hist. Med. Educ.*, p. 206. De Renzi, *Collect. Salernit.*, ii. 445, 513, 628, 650, etc.

⁴ *Hist. diplom. Frid. II. imperat.* Paris, 1854. T. iv., pars. I, p. 149, tit. 44, quoted in Puschmann's *Hist. Med. Education*, p. 207.

he must spend five years, during which period he must also acquire a knowledge of surgery, for this forms a part of medicine. After this, but not before, permission may be given him to practise, provided that he passes the examination prescribed by the authorities and at the same time produces a certificate showing that he has studied for the period required by the law." "The teachers must, during this period of five years, expound in their lectures the genuine writings of Hippocrates and Galen on the theory and practice of medicine." "But even when the prescribed five years of medical study are passed, the doctor should not forthwith practise on his own account, but for a full year more he should habitually consult an older experienced practitioner in the exercise of his profession."

"We decree that in future no one is to assume the title of doctor, to proceed to practise or to take medical charge, unless he has previously been found competent in the judgment of teachers at a public meeting in Salerno, has moreover by the testimony in writing of his teachers and of our officials approved himself before us or our representatives in respect of his worthiness and scientific maturity, and in pursuance of this course has received the state-licence to practise. Whoever transgresses this law, and ventures to practise without a licence, is subject to punishment by confiscation of property and imprisonment for a year." "No surgeon shall be allowed to practise until he has submitted certificates in writing of the teachers of the faculty of medicine, that he has spent at least one year in the study of that part of medical science which gives skill in the practice of surgery, that in the colleges he has diligently and especially studied the anatomy of the human body, and is also thoroughly experienced in the way in which operations are successfully performed and healing is brought about afterwards." ¹

For centuries after this barbers in other countries practised surgery without let or hindrance.

The doctor was bound to give advice to the poor gratis, and to inform against apothecaries who did not make up his prescriptions in accordance with the law. The doctor's fee in the daytime within the town was half a gold tareus; outside the city he could demand from three to four tareni, exclusive of his travelling expenses.² Doctors were not permitted to keep drug-shops. Apothecaries were obliged to compound the medicines in conformity with the doctor's prescriptions, and the price they charged was regulated by law. Inspectors of drug-shops were appointed to visit and report. The punishment of death was

¹ *Hist. diplom. Frid. II.*, op. cit. p. 235, lib. 3, tit. 46, etc., quoted in Puschmann's *Hist. Med. Educ.*, p. 208. *

² A gold tareus weighed twenty grains.

imposed on the officials who neglected their duties.¹ These laws have served as the pattern for succeeding enactments for the regulation of medical education and practice.

In 1252 King Conrad created the school of Salerno a university, but King Manfred in 1258 by his restoration of Naples University left Salerno only its medical school.

On the 29th of November, 1811, a decree of the French Government put an end to the oldest school of medicine in Europe.

Darembert concludes his admirable treatise on the school of Salerno with a pathetic account of a visit which he made to that city in 1849; he tells how he wandered through its streets, once so active with the movements of the students and professors of the medical sciences, and he laments that not a single remembrance of its illustrious masters remains to remind the visitor of its ancient glories. Not a stone of the edifices, not an echo of its traditions, not even a manuscript in any library remains to remind us of the learned and venerable men and women who did so much for medicine in those dark ages. A few years back I visited Salerno myself, and I found not even a decent hotel in which to remain a night or two. I rested at the best hostelry I could find, and after dinner proposed to the friend who accompanied me, that on the following day we should visit Pæstum and see its noble ruined temples. As we chatted and turned over the pages of the visitors' book, we came across a long and doleful account of an Englishman who some few years previously had visited Pæstum from Salerno, and was captured by brigands; he was detained their prisoner for many weeks, and only at last liberated, after threats of mutilation, by the payment of a heavy ransom. We did not go to Pæstum; we left Salerno early the following morning and went to Amalfi. The hotel was gloomy and crumbling into decay, the rooms were all empty, the landlord was suggestive of the host in some of the old stories of our boyish days. Thus has Salerno fallen. Most travellers now make La Cava their headquarters, and do not stay at Salerno at all.

¹ Puschmann's *Hist. Med. Educ.*, p. 210.

CHAPTER VI.

THE THIRTEENTH CENTURY.

The Crusades.—Astrology.

THE Crusades were of the highest importance to the development of Western civilization ; they brought the European world into contact with the ancient wisdom of the East, they greatly stimulated commerce, aroused a spirit of restlessness and inquiry, and thus enlarged men's minds, stimulated them to adventure and heroic deeds, improved the art of war and the invention of arms, etc. By bringing the Crusaders into contact with the Saracens many new medicines were introduced into practice ; physicians followed the armies to the East, and thus had opportunities of studying the healing art as practised in the midst of ancient civilizations. To a great extent the present advantages we enjoy are due to the influence of the Crusades, which brought to Europe many arts and sciences we should not have otherwise learned.

One of the evil consequences of the Crusades was the introduction into Europe of epidemic diseases and contagious disorders which have always had their home in the East. Thus were introduced the plague, leprosy, and the disorders which are bred of filth and promiscuous living.

In the thirteenth century very few who possessed either medical or surgical skill were not priests or monks, chiefly mendicants. The profession became very lucrative, and so many monks devoted themselves to the healing art that they neglected their spiritual duties, and were consequently forbidden to leave their monasteries for a longer period than two months at a time.¹ In this century astrology was closely related to the practice of medicine. It was believed that an intimate association existed between the heavenly bodies and those of men, and no cure could be attempted without consulting the astrological oracle.

M. Jules Andrieu says that medical science, "like the other sciences, began by being astrological. The first encyclopædia was astrology."²

¹ Aubrey, *Hist. England*, vol. i. p. 487.

² Art. "Astrology," *Ency. Brit.*, vol. ii. p. 741.

Certainly it was one of the modes most anciently and universally practised for discovering the most important things relating to the lives and fortunes of those who believed in it. It was flattering to men to believe that the heavenly bodies are interested in their welfare, and the events of life were awaited with resignation and composure by those who believed they were regulated by the stars in their courses; they applied themselves therefore to diagrams and calculations to learn the simplest and most obvious details of their lives.

M. Littré, member of the Institute and the Academy of Medicine at Paris, in his *Fragment de Médecine Rétrospective*,¹ describes seven "miracles" which took place in France at the end of the thirteenth century at the tomb of St. Louis. He states the simple facts as written in the chronicles of the period. He does not dispute them, does not ridicule nor ignore them, but endeavours to give a pathological interpretation of them. He notices in the first place that at the moment of cure the patient felt a sharp pain—the part affected seemed to be stretched or touched, and sometimes a sort of cracking sensation in the bone was experienced, then movements became possible, although the lengthening of the limb and the possibility of moving it freely were not experienced immediately; the cure was not so sudden, a period of weakness, long or short, always followed the miracle, and the part only gradually regained its use. The cracking of the bone is just what the surgeon finds when he moves a joint which has become fixed by disuse; without breaking down these adhesions, he can do nothing to restore the articulation. In cases of rheumatic paralysis a similar state of things is observed. Of course in the accounts of the healing at the tomb of St. Louis we expect to find errors and exaggerations due to the pre-occupation and ignorance of those who wrote the reports, but we at once recognise the cracking and the pain as genuine pathological details; we should not expect a natural cure without these symptoms. To what shall we attribute them? M. Littré gives the explanation in the words of M. le docteur Onimus, published in *La Philosophie positive sur la Vibration nerveuse*.² The ascending action or vibration expresses the influence of the physical on the moral; the descending action or vibration expresses the influence of the moral on the physical. In these cases it is the descending action which we have to consider. This action is exerted on the muscular portion of the affected part; it contracts energetically; it breaks down the pathological adhesions if they exist; it restores the bones violently to their place; this done, the patient is in a condition to use the limb, but not without passing through a period of debility which requires time for recovery. It is, a violent

¹ *Médecine et Médecins*, p. 125.

² Tom. iii. p. 9.

extension produced by muscular contractions. Surgery has frequently to break down such adhesions and destroy false anchyloses. Here the force is not exerted by a strange hand, but by an influence which is exerted on the muscles themselves, and this in a far more beneficent manner than surgery can afford. What is the exciting cause of these energetic contractions? That which we find in all miracles of this sort—a strong persuasion, a complete confidence. Under a profound emotion born of these sentiments, the patient, feeling that the cure was in the extension of the part, had a belief which he could understand. Of course such faith is not possible in every case. On one side there must be the mental condition which can receive in its fulness the emotion born of persuasion and confidence, and on the other that the lesions must be susceptible of cure. To a certain degree there are lesions which escape all this sort of treatment. Herbert Spencer points out¹ that muscular power fails with flagging emotions or desires which lapse into indifference, and conversely that intense feeling or passion confers a great increase in muscular force. It is brain and feeling generated by the mind which give strength to the person who thinks strongly.

ALBERTUS MAGNUS (1193–1280), one of the greatest of the schoolmen, combined with his religious speculations so great a knowledge of physical science and mechanics that he was reputed as a sorcerer. He constructed automata, some of which could speak; wrote on anatomy, physiology, botany, chemistry, astronomy, magnetism, acclimatization of plants and animals, etc. He digested, interpreted, and systematized the whole of the writings of Aristotle in accordance with the teaching of the Church. He was called, not only “Albert the Great,” but “the Universal doctor.” To his labours and those of THOMAS AQUINAS may be explained the reverence for ARISTOTLE entertained by the clergy of the Roman and Anglican churches even to the present day.

THOMAS AQUINAS (1225 *circ.*–1274), was the great Dominican theologian who wrote the *Summa Theologiae*. In his famous work he incidentally dealt with medical and physiological questions. The source of all motion is the heart. The soul is created anew in each conception. Moisture, heat, and æther alone are necessary for the generation of an individual; the lower animals originate even from putrefying matter. He wrote commentaries on the works of Aristotle, and derived many of his scientific ideas from this great master. The biology of St. Thomas, as may be imagined, is exceedingly feeble, yet it too often forms the only knowledge of the subject which continental clergymen possess.

¹ *Principles of Sociology*, vol. i. p. 53.

RAYMOND LULLI (1235-1315) was a man of great intellect, who sought the secrets of transmutation of metals and the philosopher's stone. He was a bold thinker, an astrologer, and a physician of great repute. Naturally he was accused of magic. His acquaintance with the Arabians directed his mind to the study of chemistry. He wrote on medical subjects, the titles of his best known works being *De Pulsibus et Urinis*, *De Medicina Theorica et Practica*, *De Aquis et Oleis*.

ROGER BACON (1214-1298). By theologians he was believed to be in league with the devil, because of his belief in astrology and his scientific attainments. It is probable that his reputed invention of certain optical instruments was really due to his acquaintance with Arabic, as the Arabians were familiar with the camera, burning glass, and microscope, which have been attributed to him. Neither is it the fact that he invented gunpowder, as is usually supposed. Bacon wrote voluminously on theology, philosophy, and science. Although he believed in astrology and the philosopher's stone, he had a true scientific idea of the value of experiment, which forcibly reminds us of the Francis Bacon which future ages would reveal.

"Experimental science," he said, "has three great prerogatives over all other sciences : (1) it verifies their conclusions by direct experiments ; (2) it discovers truths which they could never reach ; (3) it investigates the secrets of nature, and opens to us a knowledge of past and future."¹ As an instance of his method, Bacon gives an investigation into the phenomena of the rainbow, which is doubtless a very remarkable example of inductive research.

Roger Bacon proved himself far in advance of his time by his insistence of the supremacy of experiment. So different was his mental attitude in this regard from the temper of his time that Whewell finds it difficult to conceive how such a character could then exist.² He learned much from Arabian writers, but certainly not from them did he learn to emancipate himself from the bondage to Aristotle which everywhere enslaved them. Doubtless he learned from Aristotle himself to call no man master in science, for the Stagyrte declared that all knowledge must come from observation, and that science must be collected from facts by induction.³ Probably the truth about Aristotle is that Bacon's objections were directed against the Latin translations of the Greek philosopher, which were very bad ones. Of both Avicenna and Averroes he speaks respectfully, and it is doubted whether any passages

¹ *Ency. Brit.*, art. "Bacon, Roger."

² *History of Inductive Sciences*, vol. i. p. 341.

³ *Ibid.*, p. 342.

in Bacon's works can be construed into opposition to Aristotle's own authority.¹

Wood says² that Roger Bacon was accounted the fourth in order of the chief chemists the world had ever produced, their names being (1) Hermes Trismegistus, the first chemist, (2) Geber, (3) Morienus Romanus, (4) Roger Bacon, (5) Raymond Lulli, (6) Paracelsus.

Roger Bacon made such prodigious chemical experiments at Oxford and Paris "that none could be convinced to the contrary but that he dealt with the devil."

JEAN PITARD (1228-1315) founded the surgical society in France, which exercised a very important influence on the development of the healing art in that country, under the title of the "College de Saint Côme."³ At a time when surgery of the lower character was practised by barbers, this important corporation of educated men broke off from the inferior association and combined to form an academy of the higher surgery.

PETER DE MAHARNCOURT was an Oxford student, so "excellent in chemical experiments that he was instituted *Dominus Experimentorum*."⁴ He not only worked in metallurgy, but interested himself in "the experiments of old women, their charms, magical spells, and verses that they used to repeat when they applied or gave anything to their patients."

NICHOLAS MYREPSUS (*circ.* A.D. 1250), "Actuarius," *i.e.* physician-in-ordinary, wrote a vast work on materia medica, containing 2,656 prescriptions for every disease, real or imaginary, which afflicts our race. He had studied at Salerno.

JOHN ACTUARIUS (*circ.* 1283) was a medical genius in advance of his age. He wrote a useful materia medica and a treatise on the kidney secretion, in which he explains the use of a graduated glass for estimating the amount of sediments, which he classifies according to their colours. He appeared, says Haeser, "like the last flickerings of a dying flame" just before the Turks destroyed the glorious work of the Greeks in the civilized world.

In Edward the First's reign the king's physician had twelve pence per day for his expenses in visiting the Countess of Gloucester, the king's daughter, when she was ill.⁵

The art of poisoning was brought to considerable perfection in the

¹ Mullinger's *Hist. Cambridge Univ.*, p. 170 note.

² *Hist. Univ. Oxford*.

³ Or College of SS. Cosmas and Damian. See p. 234 of this work.

⁴ Wood's *University of Oxford*, vol. i. p. 293.

⁵ Aubrey, *Hist. England*, vol. i. p. 426.

Middle Ages, and there is abundant evidence of the fact that women were commonly agents in it.¹

In Edward the Third's reign the ladies of the household were both nurses and doctors. Regular practitioners were few, and the mistress of the house and her maidens were compelled to do the best they could in their absence. Medicinal herbs were cultivated in every garden, and were either dried or made into decoctions and kept ready for use. Many of these fair practitioners were reputed to be very skilful in medical practice. Chaucer, in the "Nonne-Prestes Tale," has left a faithful picture of the domestic medicine of the period in the character of Dame Pertelot.

¹ Aubrey, *Hist. England*, vol. i. p. 682.

CHAPTER VII.

THE FOURTEENTH CENTURY.

Revival of Human Anatomy.—Famous Physicians of the Century.—Domestic Medicine in Chaucer.—Fellowship of the Barbers and Surgeons.—The Black Death.—The Dancing Mania.—Pharmacy.

REVIVAL OF HUMAN ANATOMY.

BRIGHTER days dawned for medical science after the close of the thirteenth century, up to which era the Saracenic learning prevailed. While human dissections were impossible, the sciences of anatomy and philosophy had made no advance beyond the point at which they were left by Galen, and as he dissected only animals they were necessarily left in a very imperfect state. It is not known precisely when human dissection was revived; probably the school of Salerno, under the influence of Frederick II., has a right to the honour. In 1308, however, we find the senate of Venice decreeing that a body should be dissected annually,¹ and it is known that such dissections took place at Bologna in 1300. We have, however, nothing very definite on the subject till a few years later. Italy gave birth to the first great anatomist of Europe.

The father of modern anatomy was MONDINO, who taught in Bologna about the year 1315. Under his cultivation "the science first began to rise from the ashes in which it had been buried."² His demonstrations of the different parts of the human body at once attracted the notice of the medical profession of Europe to the school of Bologna. He died in 1325. Though he had a penetrating faculty of observation, he was not altogether original, as he copied Galen and the Arabians. He divided the body into three cavities: the upper, containing the animal members; the lower, the natural members; and the middle, the spiritual members. His anatomy of the heart is wonderfully accurate, and he came very near to the discovery of the circulation of the blood.³ He described seven pairs of nerves at the base of the brain, and was evidently acquainted with the anatomy of that organ.

¹ Baas, *Hist. Med.*

² *Ency. Brit.*, art. "Anatomy."

³ *Ibid.*

He is said to have had the assistance of a young lady, ALASSANDRA GILIANI, as prosector. Anatomical demonstrations in those days were, at the best, very imperfect. The demonstrator did not actually himself dissect; this was done by a barber-surgeon with a razor, the lecturer merely standing by and pointing out the objects of interest to the students with his staff. Nor did the process occupy much time; four lessons served to explain the mysteries of the human frame: the first was on the abdomen, the second on the organs of the chest, the third on the brain, and the fourth on the extremities.¹ The bodies were buried, or placed in running or boiling water, to soften the tissues and facilitate their examination. Dissections first took place at Prague in 1348, Montpellier after 1376, Strasburg, 1517. In Italy, sometimes, a condemned criminal was first stabbed in prison by the executioner, and then conveyed at once to the dissecting room, for the use of the doctors.

The most famous physicians of this period were:—

PETRUS APONO, or PIETRO OF ABANO (1250–1315), a famous physician, who lived at Abano near Padua, and who had studied medicine and other sciences at Padua and Paris. He travelled in Greece and other parts, acquired a knowledge of the Greek language, and was a devoted student of the works of Averroes. He endeavoured to mediate between the Arabian and the Greek physicians in their controversies on medicine, and wrote with that view his work, entitled the *Conciliator differentiarum philosophorum et precipue medicorum*. He knew enough of physiology to be aware that the brain is the source of the nerves, and the heart that of all the blood-vessels. He meddled with astrology, and was accused of practising magic, of possessing the philosopher's stone. He was found guilty on his second trial by the Inquisition; but as he died before the trial was completed, he was merely burned in effigy.

JACOB DE DONDIS (1298–1359) was a physician, who was a professor at Padua, and was famous as the author of an herbal with plates containing descriptions of simple medicines.

ARNOLD OF VILLA NOVA (1235–1312), physician, alchemist, and astrologer, did much to advance chemical science, and whose work, the *Breviarium Practicæ*, is not a mere compilation. He advised his pupils, when they failed to find out what was the matter with their patients, to declare that there was “some obstruction of the liver,”—a practice much in vogue even in the present day. He was the first to administer brandy, which he called the elixir of life (Baas). He discovered the art of preparing distilled spirits (Thomson).

Collections of medical cases first began to be preserved in an in-

¹ Puschmann, *Hist. Med. Educ.*, p. 246.

telligible form in the thirteenth century; they were called *consilia*. Those by FULGINEUS (before 1348), by MONTAGNANA (died 1470), and by BAVERIUS DE BAVERIIS, of Imola (about 1450), are said to be interesting.¹

GORDONIUS was a Scottish professor at Montpellier, who in 1307 wrote the *Practica seu Lilium Medicinæ*; it went through several editions, and was translated into French and Hebrew.

SYLVATICUS (*ob.* 1342) wrote a sort of medical glossary and dictionary.

GILBERTUS ANGLICANUS (about 1290) wrote a compendium of medicine, also called *Rosa Anglicana*, a work of European reputation, said to contain good observations on leprosy.

JOHN OF GADDESSEN was an Oxford man and a court physician, who between 1305 and 1317 wrote the *Rosa Anglica seu Practica Medicinæ*,—a work which, though of little merit, remained popular up to the sixteenth century. Some of his remedies are very curious. For loss of memory he prescribed the heart of a nightingale, and he was a firm believer in the efficacy of the king's touch for scrofula. For small-pox he prescribed the following treatment, as soon as the eruption appeared: "Cause the whole body of your patient to be wrapped in scarlet cloth, or in any other red cloth, and command everything about the bed to be made red. This is an excellent cure." Again, for epilepsy, the method of cure was as follows: "Because there are many children and others afflicted with the epilepsy, who cannot take medicines, let the following experiment be tried, which I have found to be effectual, whether the patient was a demoniac, a lunatic, or an epileptic. When the patient and his parents have fasted three days, let them conduct him to a church. If he be of a proper age, and of his right senses, let him confess. Then let him hear Mass on Friday, and also on Saturday. On Sunday let a good and religious priest read over the head of the patient, in the church, the gospel which is read in September, in the time of vintage, after the feast of the Holy Cross. After this, let the priest write the same gospel devoutly, and let the patient wear it about his neck, and he shall be cured. The gospel is, 'This kind goeth not out but by prayer and fasting.'" These quotations are both from the *Medical Rose*; and as the author was at the head of his profession, numbered princes amongst his patients, and was extolled by writers of the time, it doubtless fairly represents the practice of the period. The medicine of the period embraced the demon theory of disease and the belief in the efficacy of amulets, or more correctly of characts.

¹ *Ency. Brit.*, art. "Medicine."

DOMESTIC MEDICINE IN CHAUCER'S TIME.

CHAUCER (1340-1400), in the *Nonnes Preestes Tale*, tells us how in his time people took care of their health by attention to diet ; and how, when folk were sick, and doctors not handy, nor medicines to be had at the chemist's close by, the wise women were able, not only to prescribe skilfully, but to supply the requisite medicines from their own store or garden.

“A poure widewe, somdel stoupen in age,
Was whilom dwelling in a narwe cotage
Beside a grove, standing in a dale.

Hire diete was accordant to hire cote.
Repletion ne made hire never sike ;
Attempre diete was all hire physike
And exercise, & hertes suffisance.
The goute let hire nothing for to dance,
No apoplexie shente not hire hed,
No win ne dranke she, neyther white ne red.

‘Now, sire,’ quod she, ‘whan we flee fro the bemes,
For Goddes love, as take som laxatif ;
Up peril of my soule, & of my lif,
I conseil you the best, I wol not lie.
That both of coler, & of melancolie
Ye purge you ; and for ye shul not tarie,
Though in this toun be non apotecarie,
I shal myself two herbes techen you,
That shal be for your hele, & for your prow ;
And in our yerde, the herbes shal I finde,
The which han of hir propretee by kinde
To purgen you benethe, & eke above.
Sire, forgete not this for Goddes love ;
Ye ben ful colerike of complexion ;
Ware that the Sonne in his ascention
Ne find you not replete of humours hote :
And if it do, I dare wel lay a grote,
That ye shul han a fever tertiane,
Or elles an ague, that may be your bane.
A day or two ye shal han digestives
Of wormes, or ye take your laxatives,
Of laureole, centaurie, & fumetere,
Or elles of ellebor, that groweth there,
Of catapuce, or of gaitre-beries,
Or herbe ive growing in our yerd, that mery is ;
Picke hem right as they grow, and ete hem in.’ ”

Chaucer has indicated for us, in his Prologue to the *Canterbury Tales*, who were the great medical authors studied by English physicians of the period.

Besides Æsculapius, whose works certainly could not have reached the "Doctour of Physicke," he read Dioscorides, the famous writer on *Materia Medica* (A.D. 40-90). Rufus (of Ephesus, about A.D. 50). Old Hippocras = Hippocrates. Hali = Ali Abbas (died 994). Gallien = Galen. Serapion; there were two, the elder and the younger. Rasis = Rhazes (A.D. 850-923). Avicen = Avicenna (died 1170). Averriois = Averroës (died 1198). Damascene = Janus Damascenus, *alias* Mesue the elder (780-857). Constantin = Constantinus Africanus (1018-1085). Bernard = Bernardus Provincialis (about 1155). Gatisden = John of Gaddesden (about 1305). Gilbertin = Gilbert of England (about 1290)

"His study was but little on the Bible," says the poet, who also intimates that as gold in physic is a cordial, he was partial to fees.

FELLOWSHIP OF BARBERS AND SURGEONS.

On the 10th of September, 1348, says Anthony à Wood,¹ "appeared before Mr. John Northwode, D.D., Chancellor of the University of Oxford, John Bradey, Barber, Richard Fell, Barber Surgeon, Thomas Billye, Waferer, and with them the whole Company and Fellowship of Barbers within the precincts of Oxford, and intending thenceforward to join and bind themselves in amity and love, brought with them certain ordinations and statutes drawn up in writings for the weal of the Craft of Barbers, desiring the said Chancellor that he would peruse and correct them, and when he had so done, to put the University seal to them. Thus the Barbers of Oxford were formed into a Corporation, one of their ordinations being that no man nor servant of the Craft of Barbers or Surgery should reveal any *infirmity* or *secret* disease they have, to their customers or patients. Of which, if any one should be found guilty, then he was to pay 20s., whereof 6s. 8d. was to go to Our Lady's box, 6s. 8d. to the Chancellor, or in his absence, to the Commissary, and 6s. 8d. to the Proctors." The Barbers, Surgeons, Waferers, and makers of singing bread were all of the same fellowship. They all continued in one society till the year 1500, when the Cappers or Knitters of Caps, sometimes called Capper-Hurrers, were united to them.² In 1551 the Barbers and Waferers laid aside their charter and took one in the name of the City; but Wood says they lived without any ordination, statutes, or charter till 1675, when they received a charter from the University.³

THE BLACK DEATH.

A great pestilence desolated Asia, Europe, and Africa in the fourteenth century, which was known as *The Black Death*. Its origin was

¹ *Hist. of Univ. of Oxford*, vol. i. p. 444.

² *Ibid.*, p. 446.

³ *Ibid.*, p. 447.

oriental, and it was distinguished by boils and tumours of the glands, accompanied by black spots. Many patients became stupefied and fell into a deep sleep; they became speechless, their tongues were black, and their thirst unquenchable. Their sufferings were so terrible that many in despair committed suicide. Those who waited upon the sick caught the disease, and in Constantinople many houses were bereft of their last inhabitant. Guy de Chauliac, the physician (born about 1300), bravely defied the plague when it raged in Avignon for six or eight weeks, although the form which it there assumed was distinguished by the pestilential breath of the patients who expectorated blood, so that the near vicinity of the persons who were sick was certain death. The courageous de Chauliac, when all his colleagues had fled the city, boldly and constantly assisted the sufferers. He saw the plague twice in Avignon—in 1348, and twelve years later. Boccacio, who was in Florence when it raged in that city, has described it in the *Decameron*. No medicine brought relief; not only men, but animals sickened with it and rapidly expired. Boccacio himself saw two hogs, on the rags of a person who had died of the plague, fall dead, after staggering a little as if they had been poisoned. Multitudes of other animals fell victims to the epidemic in the same way. In France many young and strong persons died as soon as they were struck, as if by lightning. The plague spread over England with terrible rapidity. It first broke out in the county of Dorset; advancing to Devonshire and Somersetshire, it reached Bristol, Gloucester, Oxford, and London. The annals of contemporaries record the awful fact that throughout the land only a tenth of the population remained alive. The contagion spread from England to Norway. Poland and Russia suffered later in a similar manner, although the disease did not always manifest itself in the same form in every case. Only two medical descriptions of the disease have come down to us—one by GUY DE CHAULIAC, the other by RAYMOND CHALIN DE VINARIO. Chauliac notices the fatal coughing of blood; Vinario in addition describes fluxes of blood from the bowels, and bleeding at the nose. What were the causes which produced so dreadful a plague, it is impossible to discover with certainty.

Dr. Hecker, to whose work on the subject¹ I am indebted for the information concerning it, says that "mighty revolutions in the organism of the earth, of which we have credible information, had preceded it. From China to the Atlantic the foundations of the earth were shaken, throughout Asia and Europe the atmosphere was in commotion, and endangered, by its baneful influence, both vegetable and animal life."

¹ *Epidemics of the Middle Ages*, p. 13.

In 1337, 4,000,000 of people perished by famine in China in the neighbourhood of Kiang alone. Floods, famines, and earthquakes were frequent, both in Asia and Europe. In Cyprus a pestiferous wind spread a poisonous odour before an earthquake shook the island to its foundations, and many of the inhabitants fell down suddenly and expired in dreadful agonies after inhaling the noxious gases. German chemists state that a thick stinking mist advancing from the east spread over Italy in thousands of places, and vast chasms opened in the earth which exhaled the most noxious vapours.

THE DANCING MANIA.

In the year 1374 a strange delusion arose in Germany, a convulsion infuriating the human frame, and afflicting the people for more than two centuries. It was called the dance of St. John or of St. Vitus, and those affected by it performed a wild dance while screaming and foaming with fury. The sight of the afflicted communicated the mania to the observers, and the demoniacal epidemic soon spread over the whole of Germany and the neighbouring countries to the north-west.

Bands of men and women went about the streets forming circles hand in hand, and danced madly for hours together, until they fell in a state of exhaustion to the ground. They complained, when in this state, of great oppression, and groaned as if in extreme pain, till they were tightly bandaged round their waists with cloths, when they speedily recovered. While dancing they were insensible to external impressions, but their minds were in a condition of great exaltation, and they saw in their fancies heavenly beings and visitants from the world of spirits. At Aix-la Chapelle, at Cologne, and in 1418 at Strasburg, the "Dancing Plague" infatuated the people by thousands.¹

Hecker attributes the madness to the recollection of the crimes committed by the people during the visitation of the Black Plague, to the previous inundations, the wretched condition of the people of Western and Southern Germany in consequence of the incessant feuds of the barons, to hunger, bad food, and the insecurity of the times. Dancing plagues had often occurred before; in 1237 more than a hundred children were suddenly seized by it at Erfurt, and several other dates are given by historians for similar occurrences. Physicians did not attempt the cure of the malady, but left it to the priests, as it was considered to be due to demoniacal possession.

Hecker says² that Paracelsus in the sixteenth century was the first physician who made a study of St. Vitus's dance. The great reformer of medicine said: "We will not, however, admit that the saints have

¹ Hecker's *Epidemics*, p. 96.

² *Ibid.*, p. 100.

power to inflict diseases, and that these ought to be named after them, although many there are who, in their theology, lay great stress on this supposition, ascribing them rather to God than to nature, which is but idle talk. We dislike such nonsensical gossip, as is not supported by symptoms, but only by faith, a thing which is not human, whereon the gods themselves set no value."

PHARMACY.

The drug dealers of the Middle Ages had little or no relationship to our apothecaries and pharmacists.

The word *apotheca* meant a store or warehouse, and its proprietor was the *apothecarius*. From the word *apotheca* the Italians derive their *bottèga*, and the French their *boutique*, a shop. The thirteenth and fourteenth century apothecary, therefore, was altogether a different person from our own. It is probable that the Arabian physicians about the time of Avenzoar, in the eleventh century, began to abandon to druggists the business of compounding their prescriptions; the custom would then have spread to Spain, Sicily, and South Italy, where the Saracen possessions lay. This explains how so many Arabic terms became introduced into chemical nomenclature, such as *alembic*. Persons who prepared preserves, etc., were called *confectionarii*, and they made up medicines, and those who kept medicine shops were called *stationarii*. The physicians at Salerno had the inspection of the *stationes*.

Beckmann finds no proof that physicians at that time sent their prescriptions to the *stationes* to be dispensed. He says: "It appears rather that the *confectionarii* prepared medicines from a general set of prescriptions legally authorized, and that the physicians selected from these medicines kept ready for use, such as they thought most proper to be administered to their patients."¹

¹ *History of Inventions*, loc. cit.

CHAPTER VIII.

THE FIFTEENTH CENTURY.

Faith Healing.—Charms and Astrology in Medicine.—The Revival of Learning.—The Humanists.—Cabalism and Theology.—The Study of Natural History.—The Sweating Sickness.—Tarantism.—Quarantine.—High Position of Oxford University.

FAITH-HEALING.

MEDICINE in mediæval Christian history is simply the history of miracles of healing wrought by saints or by their relics. Bede's *Ecclesiastical History*, for example, is full of saintly cures and marvels of healing. The study of medical science under such circumstances could have had but little encouragement. Doctors were but of secondary importance where holy relics and saintly personages were everywhere present to cure.

In the Catholic Church there are special saints who are invoked for almost every sort of disease.

- St. Agatha, against sore breast.
- St. Agnan and St. Tignan, against scald head.
- St. Anthony, against inflammations.
- St. Apollonia, against toothache.
- St. Avertin, against lunacy.
- St. Benedict, against the stone, and also for poisons.
- St. Blaise, against the quinsey, bones sticking in the throat, etc.
- St. Christopher and St. Mark, against sudden death.
- St. Clara, against sore eyes.
- St. Erasmus, against the colic.
- St. Eutrope, against dropsy.
- St. Genow and St. Maur, against the gout.
- St. Germanus, against children's diseases.
- St. Giles and St. Hyacinth, against sterility.
- St. Hubert, against hydrophobia.
- St. Job and St. Fiage, against syphilis.
- St. John, against epilepsy and poison.
- St. Lawrence, against diseases of the back and shoulders.

St. Liberius, against the stone and fistula.
 St. Maine, against the scab.
 St. Margaret and St. Edine, against danger in child-bed.
 St. Martin, against the itch.
 St. Marus, against palsy and convulsions.
 St. Otilia and St. Juliana, against sore eyes and the headache.
 St. Pernel, against the ague.
 St. Petronilla, St. Apollonia, and St. Lucy, against the toothache.
 — and St. Genevieve, against fevers.
 St. Phaire, against hæmorrhoids.
 St. Quintam, against coughs.
 St. Rochus and St. Sebastian, against the plague.
 St. Romanus, against demoniacal possession.
 St. Ruffin, against madness.
 St. Sigismund, against fevers and agues.
 St. Valentin, against epilepsy.
 St. Venise, against chlorosis.
 St. Vitus, against madness and poisons.
 St. Wallia and Wallery, against the stone.
 St. Wolfgang, against lameness.

Pettigrew¹ gives the above list, but probably it might be considerably extended.

CHARMS AND ASTROLOGY.

A curious little MS. volume was discovered amongst the MSS. at Loseley, which contained a Latin grammar, a Treatise on Astrology, various medical recipes and precautions, with forms for making wills. It had probably been a monk's manual. The writing was the character of the fifteenth century. Some of the medical recipes and astrological precautions are said to be taken from "Master Galien (Galen), leche," thus:—"For all manner of fevers. Take iii drops of a woman's mylke yt norseth a knave childe, and do it in a hennes egge that ys sedentere (or sitting), and let hym suppe it up when the evyl takes hym.—For hym—that may not slepe. Take and wryte yese wordes into leves of lether: Ismael ! Ismael ! adjuro te per Angelum Michaelum ut soporetur homo iste ; and lay this under his bed, so yt he wot not yerof, and use it all-way lytell, and lytell, as he have nede yerto." Under the head,—"*Here begyneth ye waxingge of ye mone, and declareth in dyvers tymes to let blode, whiche be gode.* In the furste begynynge of the mone it is profetable to yche man to be letten blode ; ye ix of the mone, neyther be (by) nyght ne by day, it is not good."²

¹ *Hist. Med. Superstit.*, pp. 37, 38.

² *Loseley MSS.*, p. 263.

One Simon Trippe, a physician, writing to a patient to excuse himself for not being able to visit him, says: "As for my comming to you upon Wensday next, verely my promise be past to an old pacient of mine, a very good gentlewoman, one Mrs. Clerk, wch now lieth in great extremity. I cannot possibly be with you till Thursday. On Fryday and Saterdag the signe wilbe in the heart; on Sunday, Monday and Tuesday, in the stōmake; during wch tyme it wilbe no good dealing with your ordinary physicke untill Wensday come sevenight at the near-est, and from that time forwards for 15 or 16 days passing good."¹

This is very similar to what we find in Bede's *Ecclesiastical History*, where (A.D. 686) "a holy Bishop having been asked to bless a sick maiden, asked 'when she had been bled?' and being told that it was on the fourth day of the moon, said: 'You did very indiscreetly and unskilfully to bleed her on the fourth day of the moon; for I remember that Archbishop Theodore, of blessed memory, said that bleeding at that time was very dangerous, when the light of the moon and the tide of the ocean is increasing; and what can I do to the girl if she is like to die?'"²

Holinshed says³ that a lewd fellow, in the sixth year of Richard the Second, "took upon him to be skilful in physick and astronomy," predicted that the rise of a "pestilent planet" would cause much sickness and death amongst the people; but as the pestilence did not appear, the fellow was punished severely. Stow records⁴ that one Roger Bolingbroke, in the second year of Henry the Sixth (1423), was accused of necromancy and endeavouring by diabolical arts to consume the king's person. He was seized with all his instruments of magic and set upon a scaffold in St. Paul's Churchyard, where he abjured his diabolical arts in the presence of the Archbishop of Canterbury and many other prelates. The punishment for witchcraft was hanging or burning alive.

Strutt says⁵ that it was extremely dangerous in those days to pretend to any supernatural knowledge; as every one believed in the influence of malignant spirits, and that they were obedient to the call of the necromancers. "No contagion could happen among the cattle of a farmer, but the devil was the cause, and some conjurer was sought out; so that if any wretched vagabonds of fortune-tellers could be found, they were instantly accused of this horrid crime, and perhaps burnt alive."⁶

¹ *The Loxley MSS.*, p. 264.

² Bede's *Ecclesiastical History*, B. v. c. 3.

³ *English Chronicle*, p. 1,038.

⁴ Stow's *Chron.*, p. 381.

⁵ *Florida Angel-Cynnan*, vol. ii. p. 71.

⁶ *Ibid.*

THE REVIVAL OF LEARNING.

POPE NICHOLAS V. (1389-1455) was a man of great intellectual sympathies. He was not devoted to any one branch of learning, but was "a well-informed *dilettante*, wandering at will wherever his fancy led him." Æneas Sylvius said of him: "From his youth he has been initiated into all liberal arts; he is acquainted with all philosophers, historians, poets, cosmographers, and theologians; and is no stranger to civil and canon law, or even to medicine." He was the patron of scholars, and was equally devoted to ecclesiastical and profane literature. Although he was the son of a physician, it is not true that he was ever one himself, as has been stated.¹ It is pleasant, however, to reflect that this pope, whose name is most intimately associated with the revival of learning, probably imbibed much of the scientific lore of his time which his father's profession would encourage, and that taste for learning and that liberal spirit which has always been associated with the medical profession. The Humanists—as those who devoted themselves to the Humanities, such as philology, rhetoric, poetry, and the study of the ancient classes, were called—found a friendly reception at the papal court.

NICHOLAS OF CUSA was the reforming Cardinal Bishop of Brixen (1401-1464). Giordano Bruno called him "the divine Cusanus." In physical science he was greatly in advance of his age, and he united moral worth with intellectual gifts of the highest order.

POPE PIUS II., better known in literature as Æneas Sylvius, pope from 1458 to 1464, was also a great friend to the Humanists, a man of great intellectual power. He stands forth in history as "the figure in whom the mediæval and the modern spirit are most distinctly seen to meet and blend," ere the age of science begins to strangle the age of superstition. Professor Creighton says that Pius II. is the first writer "who consciously applied a scientific conception of history to the explanation and arrangement of passing events."²

LEONARDO DA VINCI (1452-1519), "the Faust of the Renaissance," excelled not only as an artist, but in all kinds of experimental investigation. He was an anatomist, botanist, physiologist, and chemist. Had he applied himself wholly to science, he would have been foremost in that branch to which he devoted his wonderful energies. He was one of the greatest and earliest of natural philosophers. He has been declared to have been "the founder of the study of the anatomy and structural classification of plants, the founder, or at least the chief

¹ Pastor, *History of the Popes*, vol. ii. p. 23.

² *History of the Papacy*, etc., vol. ii.

reviver, of the science of hydraulics—[the discoverer of] the molecular composition of water, the motion of waves, and even the undulatory theory of light and heat. He discovered the construction of the eye and the optical laws of vision, and invented the camera obscura. He investigated the composition of explosives and the application of steam power.”¹

MATTHEW DE GRADIBUS, of Fiuli, near Milan, in 1480 composed treatises on the anatomy of the human body. He first described the ovaries of the female correctly.

GABRIEL DE ZERBIS (about 1495), of Verona, an eminent but verbose anatomist, dissected the human subject, and recognised the olfactory nerves. He mentioned the oblique and circular muscular fibres of the stomach.

ALEXANDER ACHILLINI (1463-1512), of Bologna, the pupil of Mondino, is known in the history of anatomy as the first who described the two bones of the ear (tympanal bones), the malleus and incus. In 1503 he showed that the tarsus (or ankle and instep bones) were seven in number, so painfully and slowly was such a simple thing in human anatomy settled in those times. He was more accurately acquainted with the intestines than any of his predecessors.

CORNELIUS AGRIPPA (1486-1536) was born at Cologne, and was a profound student of what is known as “Occult Philosophy,” a strange jumble of astrology, alchemy, cabalism, theology, and the teaching of the so-called “Hermetic Books.” This sort of thing has of late years again become fashionable under the revived name of Theosophy.

He seems to have been sufficiently harmless; but as he knew much more of physical science than was considered consistent with good churchmanship in those times, he was persecuted by the monk Catilinet, and was forced to fly from place to place.

JOHANN REUCHLIN (1455-1522) was the first great German humanist. His services to learning were chiefly in connection with the restoration of Hebrew and Greek letters in Germany. He worshipped truth as his god, was interested in philosophy, especially in that of the Cabala, in which he sought a theosophy which should reconcile science with religion. His sentiments brought him into conflict with the Inquisition, but by appeal to Rome, after a long and tedious process, the trial was quashed; the consequence being that the lovers of learning and progress banded themselves together against the opponents of learning, and assured the progress of the principles of the Renaissance in Germany. Reuchlin was the author of a celebrated work, entitled *De Verbo Mirifico*.

¹ *Ency. Brit.*, art. “Leonardo.”

THE SWEATING SICKNESS.

The disease known as the sweating sickness first made its appearance in England in 1485, after the battle of Bosworth. It followed in the rear of Henry's victorious army, and spread in a few weeks from Wales to the metropolis. It is described by Hecker¹ as being "a violent inflammatory fever, which, after a short rigor, prostrated the powers as with a blow; and amidst painful oppression at the stomach, headache, and lethargic stupor, suffused the whole body with a fetid perspiration."

Holinshed² describes it thus: "Suddenlie a deadlie burning sweat so assailed their bodies and distempered their blood with a most ardent heat, that *scarce one amongst an hundred* that sickened did escape with life; for all in maner as soone as the sweat took them, or within a short time after, yeelded the ghost. Two lord mayors and six aldermen died within one week. Many who went to bed at night perfectly well were dead on the following morning; the victims, for the most part, were the robust and vigorous. One attack gave no security against a second; many were seized even a third time." The whole of England was visited by this plague by the end of the year. When it reached Oxford, professors and students fled in all directions, and the University was entirely deserted for six weeks. Medicine afforded little or no relief. Even Thomas Linacre, the founder of the Royal College of Physicians in 1518, does not in his writings say a word about the disease. As the doctors failed to help the people, their common sense had to suffice them in their need. They decided to take no violent medicine, but to apply moderate heat; take little food and drink, and quietly wait for twenty-four hours—the crisis of the disorder. "Those who were attacked during the day, in order to avoid any chill, immediately went to bed in their clothes; and those who sickened by night did not rise from their beds in the morning; while all carefully avoided exposing to the air even a hand or foot."³

The five years preceding the outbreak of this epidemic had been unusually wet, and inundations had been frequent. It is probable that this was one of the causes which contributed to the unhealthy condition of the atmosphere. The disease partook of the character of rheumatic fever, with great disorder of the nervous system.⁴ In addition to the profuse and injurious perspiration, oppressed respiration, extreme anxiety, nausea, and vomiting, indicating that the functions of the eighth pair of nerves were disturbed, were the general symptoms of

¹ *Hist. Epidemics*, p. 181.

² Hecker's *Epidemics*, p. 186.

³ *Chronicles*, vol. III. p. 422.

⁴ *Ibid.*

the malady. A stupor and profound lethargy indicated cerebral disturbance, possibly from a morbid condition of the blood.

TARANTISM.

Tarantism was a disease somewhat akin to the dancing mania. Nicholas Perotti (1430-1480) first described it. It was believed to originate from the bite of the Apulian spider, called the *tarantula*, as it was named by the Romans. Those who were bitten, or who believed themselves to have been bitten, became melancholic and stupefied, but greatly sensible to the influence of music. As soon as they heard their favourite melodies, they sprang up and danced till they sank exhausted to the ground. Others became hysterical, and some even died in a paroxysm of tears or laughter. By the close of the fifteenth century Tarantism had spread beyond the boundaries of Apulia in which it originated, and many other cities and villages of Italy were afflicted with the mania. Thus when the spider made his appearance the merry notes of the Tarantella resounded as the only cure for its bite, or the mental poison received through the eye, and thus the *Tarantali* cure became established as a popular festival.¹

Quarantine, according to William Brownrigg, who wrote in 1771 a book on the plague, was first established by the Venetians in 1484. Dr. Mead was probably the source of this information.²

Theories connected with the origin of the soul have continued to occupy the attention of theologians, philosophers, and physicians from the time of Pythagoras to our own day. Up to the ninth century their speculations were entirely idle, when Theophilus made his discovery of the capillary vessels of the male organs—a discovery which was further developed when in the fifteenth century Mattheus de Gradibus first enunciated the idea that these organs and the ovaria of birds are homologous structures; and thus originated the knowledge of the germ cells known as the ova of De Graaf.³

The fame of the University of Oxford was so high in the early part of the fifteenth century (1420) that a MS. in the Bodleian, quoted by Anthony à Wood,⁴ says that other universities were but little stars in comparison with this sun. "Other studies excel in some particular science, as Parys, in divinity; Bologna, law; Salerno, physick; and

¹ Hecker's *Epidemics*, p. 118.

² See Beckmann's *Hist. Inv.*, art. "Quarantine."

³ Meryon, *Hist. Med.*, vol. i. p. 339.

⁴ *University of Oxford*, vol. i. pp. 564, 565.

Toulouse, mathematics ; but Oxford as a true well of wisdom doth goe beyond them in all these. The bright beams of its wisdom spread over the whole world."

The practice of medicine became daily more honourable.

Holinshed says,¹ in his description of the people in the *Commonwealth of England*, that "Who soeur studieth the lawes of the realme, who so abideth in the vniuersitie giuing his mind to his booke, or professeth physicke and the liberall sciences —and can liue without manuell labour, and thereto is able and will beare the port, charge and countenance of a gentleman, he shall for monie haue a cote and armes bestowed vpon him by heralds —and reputed for a gentleman euer after."

Medicine was a flourishing study at Cambridge, especially at Merton College, in the fourteenth, fifteenth, and sixteenth centuries.²

The origin of syphilis in Europe has been the subject of much learned discussion. It appeared with such violence and frequency in the year 1490 in France, Italy, and Spain, that the scourge was considered to have only then been introduced into Europe from America.

"Its enormous prevalence in modern times," says Dr. Creighton,³ "dates, without doubt, from the European libertinism of the latter part of the fifteenth century." It is pretty certain that syphilis had existed in Europe from ancient times. What appeared with so much virulence and such wide distribution in 1490 was simply a re-development of the malady on a scale hitherto unknown.

¹ *Chronicles of England, etc.*, vol. i. p. 273.

² Mullinger's *Univ. Cambridge*, p. 168.

³ Art. "Pathology," *Ency. Brit.*, xviii. p. 404.



INTERIOR OF A DOCTOR'S HOUSE.

Facsimile of a miniature from the *Epistre de Othea*, by Christine de Pisan. (Fifteenth century MS.
in Burgundy Library, Brussels.)

[Face p. 340.]

CHAPTER IX.

MEDICINE IN ANCIENT MEXICO AND PERU.

Hospitals in Mexico.—Anatomy and Human Sacrifices.—Midwives as Spiritual Mothers.—Circumcision.—Peru.—Discovery of Cinchona Bark.

LITTLE or nothing is known of the ancient history of Mexico and Peru. Mexico, anciently called Anahuac, was probably conquered by the Aztecs, who founded the city of Mexico about 1325. It was discovered in 1517. Peru was long governed by the Incas, said to be descended from Manco Capac, who ruled in the eleventh century. It was explored and conquered by Pizarro, 1524-1533.

For the purposes of this work the history of these countries dates from the time of their discovery, as the Spaniards in their blind fanaticism destroyed most of their literature. Don Juan de Zumarraga was one of the darkeners of human intelligence; he diligently collected all the Mexican manuscripts, especially from Tezcuco, the literary capital of the Mexican empire, and burned them in one great bonfire in the market-place of Tlatelolco.¹

Las Casas says that there were public hospitals in the cities of Mexico, Tlascala, and Cholula, expressly endowed for the relief of the sick. As surgeons attended the Mexican armies, it is evident that they had attained some skill in medicine and surgery. They used the temazcalli, or vapour-bath, practised bleeding, and knew the medicinal properties of many herbs. They professed to have learned this wisdom from their ancestors, the Tultecas, whose knowledge of chemistry they likewise extolled. As human sacrifices were of daily occurrence in the city of Mexico, they must have acquired some knowledge of anatomy, which would assist them in the practice of surgery.²

Midwives were treated by the ancient Mexicans with great deference. They were termed "spiritual mothers," and were believed to be under the immediate inspiration of the god Tezcatlipoca. Aglio says that the treatment of lying-in women was very similar to that among the Jews.³

¹ Vickers' *Martyrdoms of Literature*, p. 169.

² Aglio's *Antiquities of Mexico*, vol. viii. p. 234.

³ *Ibid.*, vol. vi. p. 526.

The ancient Mexicans practised circumcision, and venerated the Tequepatl, or flint knife, with which the rite was performed.¹

Among the many vegetable products which America introduced to Europe were maize, potatoes, chocolate, tobacco, ipecacuanha, and Peruvian bark, from which we obtain quinine. The discovery of this valuable medicine was due to the Jesuit missionaries. The second wife of the viceroy, the Count of Chinchon, accompanied him to Peru. In 1628 she was attacked by a tertian fever. Her physician was unable to cure her. At about the same time an Indian of Uritusinga, near Loxa, in the government of Quito, had given some fever-curing bark to a Jesuit missionary. He sent some of it to Torres Vasquez, who was rector of the Jesuit College at Lima and confessor to the viceroy. Torres Vasquez cured the vice-queen by administering doses of the bark. . . . The remedy was long known as Countess's Bark and Jesuit's Bark, and Linnæus gave the name *Chinchona* [after the viceroy Chinchon] to the genus of plants which produces it. . . . Various species of this precious tree are found throughout the eastern cordillera of the Andes for a distance of 2,000 miles. We owe guaiacum, sarsaparilla, sassafras, logwood, jalap, seneka, serpentaria, and many other valuable drugs to the same part of the world.

Frezier, in his voyage to the South Sea and along the coasts of Chili and Peru in the years 1712, 1713, and 1714, says concerning Lima: "There is an herb called *Carapullo*, which grows like a tuft of grass, and yields an ear, the decoction of which makes such as drink it delirious for some days. The Indians make use of it to discover the natural disposition of their children. All the time when it has its operation, they place by them the tools of all such trades as they may follow—as by a maiden, a spindle, wool, scissors, cloth, kitchen furniture, etc.; and by a youth, accoutrements for a horse, awls, hammers, etc.; and that tool they take most fancy to in their delirium, is a certain indication of the trade they are fittest for, as I was assured by a French surgeon, who was an eye-witness to this verity."

¹ Aglio's *Antiquities of Mexico*, vol. vi. p. 272.

BOOK V.

THE DAWN OF MODERN SCIENTIFIC MEDICINE

CHAPTER I.

THE SIXTEENTH CENTURY.

The Dawn of Modern Science.—The Reformation of Medicine.—Paracelsus.—The Sceptics.—The Protestantism of Science.—Influenza.—Legal Recognition of Medicine in England.—The Barber-Surgeons.—The Sweating Sickness.—Origin of the Royal College of Physicians of London.—“Merry Andrew.”—Origin of St. Bartholomew’s Hospital.—Caius.—Low State of Midwifery.—The Great Continental Anatomists.—Vesalius.—Servetus.—Paré.—Influence of the Reformation.—The Rosicrucians.—Touching for the Evil.—Vivisection of Human Beings.—Origin of Legal Medicine.

THE discovery of America in 1492 fitly typifies the still grander mental world about to disclose its wonders to the newly liberated minds of scientific investigators. The revolt against authority in religion was paralleled by a scientific Protestantism; the mind of man, long held in bondage to absurd and groundless fancies, struggled to set itself free, to investigate, to test and explore on its account, instead of accepting for granted doctrines elaborated in the philosopher’s brains.

The revolt of medicine against the authority of Galen may be compared to the revolt against Aristotle in philosophy. The authority of the Arabian schools was overthrown, the principles of Hippocrates were in the ascendant. The era of the Renaissance was not more an era of Protestantism than an age of Scepticism. Faith had become credulity, and credulity had sunk into imbecility. The power of the printing press, the spread of humanism, the beginning of scientific inquiry, the discovery of the splendid treasure of classic literature, long buried beneath the dust of dark and barbarous ages, the widening of the mental horizon as the world doubled itself before the prows of the discoverers’ vessels—all these factors brought about the new birth of Science. It was the golden age of the medical sciences. Anatomy and surgery awoke, from their long slumber, and Europe entered upon a period of scientific investigation such as the world had never known before. Medicine formed an alliance with what are called its accessory sciences; chemistry liberated from slavery to the alchemist, botany set free from the delusions of the doctrine of “signatures,” pharmacy elevated into a branch of medical science from the kitchen and the

confectioner's store-room, lent their aid, in conjunction with the hydraulics and pneumatics of the natural philosopher, to advance it. All these things meant revolt against the old order, Protestantism against the outworn creeds of Greek and Arabian dogmatists. They meant more than this. Ere the ground could be cleared for the new palace of physical science which the glorious sixteenth century was to rear, scepticism must lend its withering and desolating aid; foul undergrowths must be destroyed; evil germs, bred of the stagnant marshes of the dark ages, must perish under the wholesome, if ruthless, disinfectants of reason and unbelief. There was a stern need of this. The demon theory of disease had lasted from primeval ages up to this dawn of the sixteenth century. From glacial times, through savage ages and religions, and often in beautifully poetic faiths, the disease-demon held its own. Even in the hallowed and renovating pages of the gospels the disease-demon stalks unchallenged save by the thaumaturgist. Now he is to be banished from the mind of civilized man for ever; and to reach this goal atheism was needed. The sixteenth century, so far as medicine and physical science are concerned, opens with the Cabalist Theosophists, Trithemius, Cornelius Agrippa, Cardan, and their followers. Giordano Bruno, the aggressive atheist and martyr of science, Montaigne, the philosophic sceptic, Charron, the opponent of all religion, and Rabelais, the witty scoffer at the gross corruptions of orthodoxy, helped to clear the ground for the work of the scientists. Meanwhile Paracelsus, from his chair at Basel University, having made an *auto-da-fe* of ancient and dogmatic medicine, lays the foundation-stone of the medicine of the modern era.

An army of savants begins to work for science as well as literature. Linacre has introduced Italian Humanism to the doctors of England; Caius busies himself with the Greek and Latin texts of the great writers on medicine; Gesner, the German Pliny, and Aldrovandi promote the study of natural history. Everywhere men are busy with the beginnings of electricity, chemistry, mineralogy, botany, and the other sciences which are to be the handmaidens of medicine. One clear voice is heard from Basel. It is that of Paracelsus, exhuming physical science: "You Italy, you Dalmatia, you Sarmatia, Athens, Greece, Arabia, and Israel, follow me. Come out of the night of the mind!"

The teacher of Paracelsus, who exercised the greatest influence upon his mental development, was the celebrated TRITHEMIUS, the abbot of the Spanheim Benedictines (about 1500), who was so famous a student of chemistry and the occult philosophy that scholars and mighty nobles went on pilgrimages and princes sent ambassadors, to his monastery to

gather some fragments of his vast learning. Amongst many works, he published several on magical subjects, and was the first who told the wondrous story of Dr. Faustus, in whose magical doings he was a devout believer.¹ His famous library consisted of the rare possession of two thousand volumes. Cornelius Agrippa was his pupil, and in a letter which he sent to his old master, with the manuscript of his *Occult Philosophy*, we find a passage which throws a light on the studies of the worthy abbot: "We conferred much about chemical matters, magic, cabalism, and other things which at the present time lie hidden as secret sciences and arts."²

THEOPHRASTUS BOMBASTUS PARACELSUS OF HOHENHEIM (1493-1541), "The Reformer of Medicine," "Luther Alter," effected a revolution in medicine, and is one of the most remarkable characters, not only in the history of the medical profession, but in that of civilization. There was so much in this great man's conduct to admire, and so much of which to disapprove, that it is not surprising that he has been either wholly praised or entirely condemned, and by very few considered dispassionately. Perhaps Mr. Browning, in his noble poem *Paracelsus*, has given the world the truest conception of a man who did for his profession and for humanity the enormous service of liberating medicine from a slavish adhesion to authority, though it must be admitted that he was guilty of extravagances and excesses we may find it difficult to excuse, even though for the most part they were faults common to his country and his age. Paracelsus was born ten years later than Luther, at Einsiedeln, near Zurich. He studied under the abbot Trithemius of Spanheim, who was a great adept in magic, alchemy, and astrology. Under this teacher he acquired a taste for occult studies, and formed a determination to use them for the welfare of mankind. Trithemius was a theosophist. As was the custom of the times, Paracelsus became an itinerant student after his course at the University of Basel. He studied chemistry in the laboratory of the Fuggers at Schwatz, in the Tyrol.

Attached to the armies, he travelled widely as a military surgeon in the Netherlands, the Romagna, Naples, Venice, Denmark. He worked in the mines, that he might acquire a knowledge of metals, working as a common labourer for his bread. In Bohemian fashion he wandered over the world, visiting Spain, Portugal, Egypt, Tartary, and the East. He picked up his scientific knowledge by any means rather than from books. He said, "Reading never made a doctor, but

¹ Morley, *Life of Cornelius Agrippa*, vol. i. p. 213.

² *H. C. Agrippa*, ep. 23, lib. i. p. 702. Prefixed also to all editions of the *De Occ. Phil.* (Note by Mr. Morley.)

practice is what forms a physician. For all reading is a footstool to practice, and a mere feather broom. He who meditates discovers something." And so he held converse with the common folk, and talked and drank with boors, shepherds, Jews, gypsies, and tramps, gaining odd scraps of knowledge wherever he could. He had no books. His only volume was Nature, whom he interrogated at first-hand. He would rather learn medicine and surgery from an old country nurse than from an university lecturer. If there was one thing which he detested more than another, it was the principle of authority. He bent his head to no man.

In the year 1525 Paracelsus went to Basel, where he was fortunate in curing Froben, the great printer, by his laudanum, when he had the gout. Froben was the friend of Erasmus, who was associated with Œcolampadius, and soon after, upon the recommendation of Œcolampadius, he was appointed by the city magnates a professor of physics, medicine, and surgery, with a considerable salary; at the same time they made him city physician, to the duties of which office he requested might be added inspector of drug shops. This examination made the druggists his bitterest enemies, as he detected their fraudulent practices; they combined to set the other doctors of the city against him, and as these were exceedingly jealous of his skill and success, poor Paracelsus found himself in a hornet's nest. We find him a professor at Basel University in 1526. He has become famous as a physician, the medicines which he has discovered he has successfully used in his practice; he was now in the eyes of his patients at least,

"The wondrous Paracelsus, life's dispenser,
Fate's commissary, idol of the schools and courts."

He began his lectures at Basel by lighting some sulphur in a chafing dish, and burning the books of his great predecessors in the medical art, Avicenna, Galen, and others, saying: "Sic vos ardebitis in gehennâ." He boasted that he had read no books for ten years, though he protested that his shoe-buckles were more learned than the authors whose works he had burned.

It must have been a wonderful spectacle when this new teacher took his place before his pupils. The benches occupied hitherto by a dozen or two of students were crowded with an eager audience anxious for the new learning. Literature had been exhumed many years before, and now it was the turn of Science! Leaving the morbid seclusion of the cloisters, men had given up dreaming for inquiry, and baseless visions for the acquisition of facts. This was the childhood of our science, and its days were bright with the poetry of youth. It is a sight to arouse

our enthusiasm to see in the early dawn of our modern science this man standing up alone to pit himself against the whole scientific authority of his day. He rises from the crucibles and fires where his predecessors had been vainly seeking for gold and silver, ever and again pretending to have found them, and always going empty-handed to a deluded world. Henceforth, he says, his alchemy shall serve a nobler purpose than gold seeking; it shall aid in the healing of disease. He casts aside the sacred books of medicine which have been handed down the ages by his predecessors; destroying them, he declares, with an earnestness which is less tinged by arrogance than by conviction, that these men had been blind guides, that he alone has the clue of the maze, and he forsakes all to follow Truth, though she lead him to death. In his generous impulse to serve mankind he has spoken harshly of his opponents. They would not have helped him, any way. He was above them; they could not understand him, so they hated him, and he scorned them. As too often happens to such heroes, he forgot the love of his neighbour in his love for mankind.

Paracelsus found his pupils holding fast by the teachings of the school of Salerno, and there seems no ground for supposing that the healing art had made the slightest progress in Europe from the foundation of that school in 1150, except perhaps in pharmacy. On the day that Paracelsus stood up before his audience at Basel University, he cried, "Away with Ætius, Oribasius, Galen, Rhasis, Serapion, Avicenna, Averröes, and the other blocks!" He had diplomas sent him from Germany, France, and Italy, and a letter from Erasmus.

In 1528 we find him at Colmar, in Alsatia. He has been driven by priests and doctors from Basel.

He had been called to the bedside of some rich cleric who was ill. He cured him, but so speedily that his fee was refused. Though not at all a mercenary man (for he always gave the poor his services gratuitously), he sued the priest; but the judge refused to interfere, and Paracelsus used strong language to him, and had to fly to escape punishment. We must not be too hard upon the canon. Disease was treated with profound respect in those days, and great patients liked to be cured with deliberation and some ceremonial.

The closing scenes of the life of Paracelsus were passed in a cell in the hospital of Salzburg, in the year 1541, when he died at the age of forty-eight, a martyr of science. Recent investigations in contemporary records have proved that he had been attacked by the servants of certain physicians who were his jealous enemies, and that in consequence of a fall he sustained a fracture of the skull, which proved fatal in a few days.

Within a period of time covering fifteen years he had written some 106 treatises on medicine, alchemy, natural history and philosophy, magic, and other subjects. He despised University learning. "The book of Nature," he declared, "was that which the physician should read, and to do so he must walk over its leaves." His library consisted of a Bible, St. Jerome on the Gospels, a volume on medicine, and seven manuscripts. His epitaph tells but a part of his honours. "Here lies Philippus Paracelsus, the famous doctor of medicine, who, by his wonderful art, cured bad wounds, lepra, gout, dropsy, and other incurable diseases, and to his own honour divided his possessions among the poor."

This but feebly expresses what medicine owes to him. He discovered the metal zinc, and hydrogen gas. In place of the elaborate concoctions and filthy messes which were given as medicines in his time, he taught doctors to give tinctures and quintessences of drugs. He invented laudanum, and anticipated our discovery of transfusion of blood. He opposed the barbarous method of reducing dislocations and dealing with fractures, introduced the use of mercury in the treatment of syphilis, and came very near to the discoveries which go under the name of Darwinism. He taught that chemistry was to be employed, not in making gold, but for the preparation of medicines; and he introduced into practice mineral remedies, including mineral baths, iron, sulphur, antimony, arsenic, gold, tin, lead, etc. Amongst the vegetable remedies employed by him was arnica.

Paracelsus used chemical principles, says Sprengel, for the explanation of particular diseases. "Most or all diseases, according to him, arise from the effervescence of salts, from the combustion of sulphur, or from the coagulation of mercury."¹

His ætiology attributed diseases to five causes:—1. The *Ens astrale* (a certain power of the stars); this means no more than foul air. 2. The *Ens veneni* (power of poison), arising from errors of assimilation and digestion. 3. The *Ens naturale* (power of nature or of the body); diatheses. 4. *Ens spirituale* (power of the spirit); the disorders which arise from perverted ideas. 5. *Ens Dei* (power of God); the injuries or causes of disease predetermined by God.²

When Paracelsus came upon the scene of medical history, alchemy had just begun to lose its credit. The true students of science had discovered its deceptions and had abandoned it to the quacks. It has often happened, and happens still, that certain pretended sciences, when cast aside as worthless, are taken from their hiding-places and made to

¹ Whewell, *Hist. of Scientific Ideas*, vol. ii. p. 177.

² Baas, *Hist. Med.*, p. 386.

do duty in another and perhaps nobler form. Paracelsus set himself the task of rehabilitating alchemy. The deeper thinkers, the more ardent truth-seekers in religion and science, imbued with philosophy and penetrated by the scholasticism of the age, were quite ready for a new reign of theosophical medicine to take the place of the Arabian polypharmacy.

GEORGE AGRICOLA (1494-1555) was a physician who practised in Bohemia, and was the first to raise mineralogy to the dignity of a science. He did so much for it, in fact, that no great advance was made in it from the point at which he left it, till the eighteenth century.

CONRAD GESNER (1516-1565), surnamed the German Pliny, was a famous naturalist of vast erudition, and imbued with an enthusiastic love of science. In 1541 he was professor of physics and natural history at Zurich. He wrote several books on ancient medicine and botany. To prepare himself to write his *History of Animals*, he read 250 authors, travelled nearly all over Europe, and gathered information from every source, even from hunters and shepherds. His medical works show that he was far above the absurd fancies and prejudices of his time.

ANDREAS CÆSALPINUS (1519-1603), the first systematical botanist, and the founder of the work which Linnæus developed, studied, if he did not also teach, anatomy and medicine at Pisa. He had a clear idea of the circulation of the blood, at least through the lungs, and he was the first to use the term "circulation." Claims have been made on his behalf as the discoverer of the circulation; but they cannot be substantiated, as he did not know of the *direct* flow of the blood from the arteries to the veins.

CARDAN (1501-1576), a physician and astrologer, was also a half-crazy magician. He was a skilful physician, and visited King Edward VI. to calculate his nativity, and Cardinal Beaton to cure him in his sickness.

GIORDANO BRUNO (1548-1600) was an Italian philosopher of the Renaissance, who, from a determination to study the universe for himself, threw off the restraints of the Christian religion and revolted against the authority of Aristotle and tradition. His most popular and characteristic work is the *Spaccio*. He was not an atheist, as has been asserted, but a pantheist. He considered the soul of man as a thinking monad, and as immortal. He was burnt at the stake for his opinions, which, it must be admitted, were in some respects detrimental to morality as well as to faith.

MICHEL DE MONTAIGNE (1533-1592), the sceptical founder of a new philosophy, and one of the most delightful of essayists, anticipated the

scientific spirit by his minute and critical observation upon the curious facts connected with human nature.

FRANÇOIS RABELAIS (c. 1490-1553) entered the faculty of medicine at Montpellier.

EURICUS CORDUS (1486-1535), who studied medicine at Erfurt, is famous for the following admirable epigram :—

“Three faces wears the doctor : when first sought,
An angel’s—and a God’s, the cure half wrought ;
But, when that cure complete, he seeks his fee,
The Devil looks then less terrible than he.”

His son, VALERIUS CORDUS (1515-1544), was the discoverer of sulphuric ether.

ANTONIO BENIVIENI (c. 1500), a physician of Florence, was the morning star of a new era for surgery, when he insisted that the compilations of the ancients and Arabians ought to be given up for the observation of nature.¹ Thus, before the time of Ambroise Paré (1509-1590), the way for the reception of the true modern surgery was prepared in Italy by the efforts of those who strove to induce educated and talented men to devote their attention to this branch of the healing art.

INFLUENZA.

A violent and extensive catarrhal fever prevailed in France and Europe generally in 1510. Hecker considers there is evidence that it had its origin in the remotest parts of the East.² His description of this influenza is as follows : “The catarrhal symptoms, which, on the appearance of disorders of this kind, usually form their commencement, seem to have been quite thrown into the background by those of violent rheumatism and inflammation. The patient was first seized with giddiness and severe headache ; then came on a shooting pain through the shoulders and extending to the thighs. The loins, too, were affected with intolerably painful dartings, during which an inflammatory fever set in with delirium and violent excitement. In some the parotid glands became inflamed, and even the digestive organs participated in the deep-rooted malady ; for those affected had, together with constant oppression at the stomach, a great loathing for all animal food, and a dislike even of wine. Among the poor as well as the rich many died, and some quite suddenly, of this strange disease, in the treatment of which the physicians shortened life not a little by their purgative treatment and phlebotomy, seeking an excuse for their ignorance in

¹ *De abditis rerum causis*, Florent., 1507.

² *Epidemics*, p. 378.

the influence of the constellations, and alleging that astral diseases were beyond the reach of human art."

LEGAL RECOGNITION OF MEDICAL PRACTITIONERS.

The first Act of Parliament dealing with the medical profession in England was passed in the year 1511, and is entitled "AN ACT FOR THE APPOINTING OF PHYSICIANS AND SURGEONS," the preamble of which runs as follows :—

"Forasmuch as the science and cunning of Physick and Surgery (to the perfect knowledge of which be requisite both great learning and ripe experience) is daily within this realm exercised by a great multitude of ignorant persons, of whom the greater part have no manner of insight in the same, nor in any other kind of learning ; some also can read no letters on the book, so far forth that common artificers, as smiths, weavers, and women, boldly and accustomedly take upon them great cures, and things of great difficulty, in the which they partly use sorcery and witchcraft, partly apply such medicines unto the disease as be very noxious, and nothing meet therefore, to the high displeasure of God, great infamy to the faculty, and the grievous hurt, damage, and destruction of many of the king's liege people ; most especially of them that cannot discern the uncunning from the cunning. Be it therefore (to the surety and comfort of all manner of people) by the authority of this present Parliament enacted :—That no person within the city of London, nor within seven miles of the same, take upon him to exercise and occupy as a Physician or Surgeon except he be first examined, approved, and admitted by the Bishop of London, or by the Dean of St. Paul's, for the time being, calling to him or them four Doctors of Physic, and for Surgeons, other expert persons in that faculty ; and for the first examination such as they shall think convenient, and afterwards alway four of them that have been so approved.¹ . . .

"That no person out of the said city and precinct of seven miles of the same, except he have been (as is aforesaid) approved in the same, take upon him to exercise and occupy as a Physician or Surgeon, in any diocese within this realm ; but if he be first examined and approved by the Bishop of the same diocese, or, he being out of the diocese, by his vicar-general ; either of them calling to them such expert persons in the said faculties, as their discretion shall think convenient. . . ." ²

¹ 3 Henry VIII., c. 9.

² Dr. Goodall's *History of the College of Physicians*.

THE BARBER-SURGEONS.

The occupation of shaving and trimming beards was anciently considered a profession, and was united to that of surgery. In the reign of Louis XIV. of France the hairdressers were formally separated from the Barber-Surgeons, who were incorporated as a distinct medical body.

A London Company of Barbers was formed in 1308, and the first year of the reign of Edward IV. (1462) the barbers were incorporated by a charter which was confirmed by many succeeding monarchs. In 1540 the Company of Barbers, and those who practised purely as Surgeons, were united as "the commonalty of Barbers and Surgeons of London." It was enacted (32 Hen. VIII.) that "No person using any shaving or barbery in London shall occupy any surgery, letting of blood, or other matter, except only drawing of teeth." The Surgeons' corporation in London two years later petitioned Parliament to be exempted from bearing arms and serving on juries, so that they might be free to attend to their practice.¹ Their petition was granted, and all medical men are in the enjoyment of these privileges at the present time.

An Act of Parliament was passed in 1540 allowing the United Companies of Barbers and Surgeons to have yearly four bodies of criminals for purposes of dissection. This is supposed to have been the first legislative enactment passed in any country for promoting the study of anatomy.²

Surgery in England in the reign of Henry VIII. was in a deplorable condition. Thomas Gale thus describes the surgeons of the time :—

"I remember when I was in the wars at Montreuil, in the time of that most famous prince, Henry VIII., there was a great rabblement there that took upon them to be surgeons. Some were sow-gelders, and some horse-gelders, with tinkers and cobblers. This noble sect did such great cures that they got themselves a perpetual name; for like as Thessalus' sect were called Thessalonians, so was this noble rabblement, for their notorious cures, called dog-leeches; for in two dressings they did commonly make their cures whole and sound for ever, so that they felt neither heat nor cold, nor no manner of pain after. But when the Duke of Norfolk, who was then general, understood how the people did die, and that of small wounds, he sent for me and certain other surgeons, commanding us to make search how these men came to their death, whether it were by the grievousness of their

¹ Aubrey, *Hist. Eng.*, vol. ii. p. 535.

² *Ibid.*

wounds or by the lack of knowledge of the surgeons; and we, according to our commandment, made search through all the camp, and found many of the same good fellows which took upon them the names of surgeons; not only the names but the wages also. We asking of them whether they were surgeons or no, they said they were; we demanded with whom they were brought up, and they, with shameless faces, would answer, either with one cunning man, or another, which was dead. Then we demanded of them what chirurgery stuff they had to cure men withal; and they would show us a pot or a box which they had in a budget, wherein was such trumpery as they did use to grease horses' heels withal, and laid upon scabbed horses' backs, with verval and such like. And others that were cobblers and tinkers used shoemaker's wax, with the rust of old pans, and made therewith 'a noble salve,' as they did term it. But in the end this worthy rabblement was committed to the Marshalsea, and threatened to be hanged for their worthy deeds, except they would declare the truth—what they were and of what occupations; and in the end they did confess, as I have declared to you before."

Gale says in another place: "I have, myself, in the time of King Henry VIII., helped to furnish out of London, in one year, which served by sea and land, three score and twelve surgeons, which were good workmen, and well able to serve, and all Englishmen. At this present day there are not thirty-four of all the whole company of Englishmen, and yet the most part of them be in noblemen's service, so that if we should have need, I do not know where to find twelve sufficient men. What do I say? sufficient men? Nay; I would there were ten amongst all the company worthy to be called surgeons."

In the year 1518 the Barbers and Surgeons were united in one company. The Barbers were restricted from performing any surgical operations, except drawing teeth, and the Surgeons, on their part, had to abandon shaving and trimming beards. Physicians were permitted to practise surgery.

In the year 1542 it became necessary to pass an Act to further regulate the practice of Surgery, the chief points of which are the following: "Whereas in the Parliament holden at Westminster, in the third year of the King's Most Gracious Reign, amongst other things, for the avoiding of sorceries, witchcrafts, and other inconveniences, it was enacted, That no person within the City of London, nor within seven miles of the same, should take upon him to exercise and occupy as Physician and Surgeon, except he be first examined, admitted, and approved by the Bishop of London, etc. . . . Sithence the making of which said Act, the Company and Fellowship of Surgeons of Lon-

don, minding onely their owne lucre, and nothing the profit or ease of the diseased or patient, have sued, troubled, and vexed divers honest persons, as well men as women, whom God hath endued with the knowledge of the nature, kind and operation of certain herbs, roots and waters, and the using and ministering of them, to such as have been pained with custumable diseases, as women's breasts being sore, a pin and the web in the eye, uncomes of the hands, scaldings, burnings, sore mouths, the stone, stranguary, saucelin, and morphew, and such other like diseases. . . . And yet the said persons have not taken anything for their pains or cunning. . . . In consideration whereof, and for the ease, comfort, succour, help, relief, and health of the King's poor subjects, inhabitants of this his realm, now pained or diseased, or that hereafter shall be pained or diseased, Be it ordained, etc., that at all time from henceforth it shall be lawful to every person being the King's subject, having knowledge and experience of the nature of herbs, roots and waters, etc., to use and minister according to their cunning, experience, and knowledge . . . the aforesaid statute . . . or any other Act notwithstanding."

THE SWEATING SICKNESS.

In 1517 England was visited by a third attack of the Sweating Sickness. Public business was suspended, the King moved his court from place to place, and a panic seized the people. Erasmus, writing to Wolsey's physician, says: "I am frequently astonished and grieved to think how it is that England has been now for so many years troubled by a continual pestilence, especially by a deadly sweat, which appears in a great measure to be peculiar to your country. I have read how a city was once delivered from a plague by a change in the houses, made at the suggestion of a philosopher. I am inclined to think that this also must be the deliverance for England." He proceeds to suggest that better ventilation is necessary for dwellings; he remarks that the glass windows admit light, but not air; that such air as does enter comes in as draughts, through holes and corners full of pestilential emanations. The floors laid with clay and covered with rushes, the bottom layer of which was unchanged sometimes for twenty years, harboured expectorations, vomitings, filth, and all sorts of abominations.

He advises that the use of rushes should be given up, that the rooms should be so built as to be exposed to the light and fresh air on two or three sides, and that the windows be so constructed as to be easily opened or closed. He declares that at one time, if he ever entered a room which had not been occupied for some months, he was sure to

take a fever. He suggests that the people should eat less, especially of salt meats, and that proper officers be appointed to keep the streets and suburbs in better order. Erasmus was thus our first sanitary reformer.

Aubrey gives ¹ a selection of the favourite prescriptions in use at this period against the Sweating Sickness :—

“Take endive, sowthistle, marygold, m’oney and nightshade, three handfuls of all, and seethe them in conduit water, from a quart to a pint, then strain it into a fair vessel, then delay it with a little sugar to put away the tartness, and then drink it when the sweat taketh you, and keep you warm; and by the grace of God ye shall be whole.”

“Take half an handful of rew, called herbe grace, an handful marygold, half an handful featherfew, a handful sorrel, a handful burnet, and half a handful dragons, the top in summer, the root in winter ; wash them in running water, and put them in an earthen pot with a pottle of running water, and let them seethe soberly to nigh the half be consumed, and then draw aback the pot to it be almost cold, and then strain it into a fair glass and keep it close, and use thereof morn and even, and when need is oftener ; and if it be bitter, delay it with sugar candy ; and if it be taken afore the pimples break forth, there is no doubt but with the grace of Jesu it shall amend any man, woman or child.”

“Another very true medicine.—For to say every day at seven parts of your body, seven paternosters, and seven Ave Marias, with one Credo at the last. Ye shal begyn at the ryght syde, under the ryght ere, saying the ‘*paternoster qui es in cœlis, sanctificetur nomen tuum,*’ with a cross made there with your thumb, and so say the paternoster full complete, and one Ave Maria, and then under the left ere, and then under the left armhole, and then under the left the [thigh?] hole, and then the last at the heart, with one paternoster, Ave Maria, with one Credo ; and these thus said daily, with the grace of God is there no manner drede hym.”

THE ROYAL COLLEGE OF PHYSICIANS OF LONDON ESTABLISHED.

The Royal College of Physicians of London was founded by Henry VIII. for the repression of irregular and unlearned medical practice. The Letters Patent constituting the College were dated 23rd September, 1518. The king was moved to this by the example of similar institutions in Italy and elsewhere, by the solicitations of Thomas Linacre, one of his own physicians, and by the advice and recommendation of Cardinal Wolsey. Six physicians are named in the

¹ *Hist. Eng.*, vol. ii. p. 296.

Letters Patent as constituting the College, viz., John Chambre, Thomas Linacre, and Ferdinand de Victoria, the king's physicians ; and Nicholas Halsewell, John Francis, and Robert Yaxlery, physicians, "and all men of the same faculty, of and in London, and within seven miles thereof, are incorporated as one body and perpetual community or college." ¹

DR. CHAMBRE was a priest before he became a physician. He was educated at Oxford, studied at Padua, where he graduated in physic.

DR. THOMAS LINACRE was a distinguished scholar and physician, who was born A.D. 1460. In 1484 he was elected a fellow of All Souls', Oxford ; the next year he went to Bologna, where he studied under Pulitian ; he then went to Florence, where he became acquainted with Lorenzo the Great ; from Florence, he went to Rome, and thence to Venice and Padua, which at that time was the most celebrated school of physic in the world, and took the degree of Doctor of Medicine with the highest applause. Linacre founded (1524) two Physic Lectures at Oxford and one at Cambridge, but "they were not performed till divers years after Linacre's death, on account of the troubles concerning religion." ²

DR. ANDREW BORDE, Carthusian monk, physician, wit and buffoon, lived in the reign of Henry VIII. He took his physician's degree at Montpellier in 1532, and afterwards became one of the court physicians on his return to England. He was a learned, genial, and sensible doctor, but possessed "a rambling head and an inconstant mind," as Anthony à Wood says. He wrote voluminously. His chief works, the *Breviary of Health*, *The Dietary of Health*, and *The Book of the Introduction to Knowledge*, have been edited by Dr. F. J. Furnivall, and published for the Early English Text Society in a volume which is one of the most entertaining works on medicine ever written. Borde earned his title of "Merry Andrew" (a name which has become a household word) from attending fairs and revels, and conducting himself with the buffoonery which ill became so learned a man. Doubtless, however, it endeared him to his countrymen of the period. His medical works are full of prescriptions for various complaints, and many of them are exceedingly valuable and fully equal to the best treatment followed now.

THOMAS VICARY was probably born between 1490 and 1500, was not a trained surgeon, but "a meane practiser" at Maidstone. In 1525 he was junior of the three Wardens of the Barbers' or Barber-Surgeons' Company in London. In 1528 he was Upper or First Warden of the

¹ Munk, *Roll of the Royal College of Physicians of London*, p. 1.

² Wood, *Hist. Oxford*, vol. ii. p. 862.

Company, and one of the surgeons to Henry VIII., at £20 a year. In 1530 he was Master of the Barber-Surgeons' Company, and at the head of his profession till his death in 1561 or 1562. As Dr. Furnivall says, he was "the Paget of his great Tudor time." Soon after the dissolution of the monasteries, Henry VIII., at the request of the City of London, handed over the monastic hospitals, Bartholomew's and others, to the Corporation of London. He gave to Bartholomew's a small endowment (nominally £333 odd) out of old houses which he charged with pensions to parsons. The city raised £1000 for repairs and reopened the hospital for one hundred patients, and on 29th September, 1548, appointed Chief-Surgeon VICARY as one of the six new governors of the hospital. The reorganization of the hospital was in a large measure due to this excellent man and intelligent surgeon. In 1548 he published the first English work on Anatomy, *The Anatomie of the Body of Man*, which was reprinted by the Surgeons of Bartholomew's in 1577. This text-book held the field for 150 years.¹

Those who are interested in the origin of our oldest and greatest hospital in London will find much valuable information in the *Truly Christian Ordre of the Hospital of S. Bartholomewes*, 1552, published as Appendix XVI. in Dr. Furnivall's *Vicary*, p. 291.

ROBERT COPLAND in 1547 or 48 published his book called *The Hy Way to the Spitt House*. This is an important and interesting account of the scamps and rogues who resorted to St. Bartholomew's Hospital, London, in the time of Henry VIII., after the Statute 22nd Hen. VIII. (1530-1), against vagabonds. At that time the hospital gave temporary lodging to almost all the needy, as well as a permanent home to the deserving poor and sick; and sisters attended to them. Copland learns from the porter all about the ne'er-do-wells and the rascals who sought to impose on the charity.²

The old herbalists were often very patient and devoted investigators, who experimented upon themselves, and by these means accumulated a great number of facts of great use in the art of medicine. Conrad Gesner was one of these; he used to eat small portions of wild herbs, and test their effects on his own person, sitting down in the study with the plants around him.³

SIR WILLIAM BUTTS, M.D. (died 1545), was physician to Henry VIII., and was the friend of Wolsey, Cranmer, and Latimer. He was

¹ I am indebted for the above facts to Dr. Furnivall's edition of *Vicary's Anatomie*, published for the Early English Text Society.

² *Captain Cox, his Ballads and Books*. Dr. Furnivall's edition, published for the Ballad Society, p. ci.

³ Pratt, *Flowering Plants*, vol. i. p. 91.

knighted by Henry, and is immortalised in Shakspeare's play of *Henry VIII.*

GEORGE OWEN, M.D. (died 1558), was physician to Henry VIII., Edward VI., and Queen Mary. It has been said that Edward VI. was brought into the world by Dr. Owen, who performed the Cæsarian operation on his mother.

JOHN CAIUS, M.D. (1510-1573), entered Gonville Hall, Cambridge, 1529. He at first studied divinity, but in 1539 went to Padua to study medicine under Montanus. Whilst at Padua, Caius lodged in the same house with the anatomist Vesalius, devoting no less attention to anatomy than his companion. He took the degree of doctor of medicine at Padua. He was public professor of Greek in that University; in 1543 he visited all the great libraries of Italy, collecting MSS., with the view of giving correct editions of the works of Galen and Celsus. In 1552 he was residing in London, and published an account of the Sweating Sickness which prevailed in 1551. He was physician to Edward VI., Mary, and Elizabeth. Dr. Caius enlarged and augmented the resources of the college at Cambridge, at which he had been educated; and he rendered eminent service to the College of Physicians by defending its rights against the illegal practices of the surgeons, who interfered with the proper functions of the physicians. His munificent foundation at Cambridge is a claim on the gratitude of the English nation, and ensures him a high place for ever in the annals of our universities. The visitor to Cambridge will not fail to remember that it was he who built the three singular gates at his college, inscribed to Humility, to Virtue and Wisdom, and to Honour. But he has another lasting claim to respect on the grounds that he first introduced the study of practical anatomy into this country, and was the first publicly to teach it, which he did in the hall of the Barber-Surgeons, shortly after his return from Italy. Dr. Caius was a profound classical scholar, and left numerous works on the Greek and Latin medical authors. As a naturalist, linguist, critic, and antiquary, he was no less distinguished than as a physician.

EDWARD WOTTON, M.D. (died 1555), seems to have been the first English physician who applied himself specially to the study of natural history. He made himself famous by his work on this subject, entitled *De Differentiis Animalium*.

DR. GEYNES (died 1563) was cited before the College of Physicians for impugning the authority of Galen; he recanted and humbly acknowledged his heresy, and was duly pardoned. The circumstance is a curious illustration of the sentiments of the times.¹

¹ Munk's *Roll of the Royal College*, etc., p. 62.

SIMON LUDFORD was originally a friar who became an apothecary in London, who was admitted by the University of Oxford to the baccalaureate in medicine, although totally ignorant and incompetent. The College reproved the University, and he was compelled to undergo a course of study, when he was ultimately admitted doctor of medicine in Oxford, and Fellow of the College of Physicians in 1563.

WILLIAM GILBERT, M.D. (born 1540), engaged in experiments relative to the magnet, achieving results which Galileo declared to be "great to a degree which might be envied," and which induced Galileo to turn his mind to magnetism.¹

THOMAS PENNY, M.D. (practised in London, 1570-1). Gerard styles him "a second Dioscorides, for his singular knowledge of plants." He was also one of the first Englishmen who studied insects.

PETER TURNER, M.D. (died 1614), was physician to St. Bartholomew's Hospital, and one of the greatest botanists of his age.

THOMAS MUFFET, M.D., the learned friend of distinguished physicians and naturalists, was esteemed in his day the famous ornament of the body of physicians (died 1604).

BERENGER OF CARPI (died 1527) flourished at Bologna (1518). He was a zealous anatomist, and declared that he had "dissected more than one hundred human bodies." He was the first who recognised the larger proportional size of the male chest than the female, and the converse concerning the pelvis. He discovered the two arytenoid cartilages in the larynx, first accurately described the thymus, and gave a good description of the brain and the internal ear, in which he noticed the *malleus* and *incus*. He rectified some of the mistakes of Mondino, but was, like all other anatomists before Harvey, deeply perplexed about the heart and the circulation. He investigated the structure of the valves of the heart.

The art of midwifery, up to the middle of the sixteenth century, was in the lowest possible condition. In 1521, a doctor named Veites was condemned to the flames in Hamburg, for engaging in the business of midwifery. In the year 1500, the wife of one JACOB NUFER, of Thurgau, a Swiss sow-gelder, being in peril of her life in pregnancy, though thirteen midwives and several surgeons had attempted to deliver her in the ordinary way, it occurred to her husband to ask permission of the authorities, and the help of God, to deliver her "as he would a sow." He was completely successful, and thus performed the first Cæsarian operation on the living patient, who lived to bear

¹ *Times*, May 20, 1876, p. 6. Hallam, *Literary History*, etc., vol. ii. p. 233.

several other children in the natural way, and died at the age of seventy-seven. Another sow-gelder performed the operation of ovariectomy on his own daughter, in the sixteenth century.

FRANÇOIS ROUSSET (about 1581), physician to the Duke of Savoy, was the first to write upon the Cæsarian operation. The improvement in printing and engraving caused the works of the Greek, Roman, and Arabian writers to be more widely known, and manuals were published for the instruction of midwives. The first book of this kind was by EUCHARIUS ROSLEIN, at Worms, called the *Rose Garden for Midwives* (1513). VESALIUS (1543) rendered great services to the obstetric art by his anatomical teaching; and when Rousset published his treatise, the operation became popular, and was constantly performed on the living subject, sometimes even when it was not absolutely necessary. PINEAU, a surgeon of Paris, in 1589, first suggested division of the pubes to facilitate difficult labour.

In the year 1535 (27 Henry VIII.), Wood says¹ that at Oxford "divers scholars, upon a foresight of the ruin of the clergy, had and did now betake themselves to physick, who as yet raw and inexpert would adventure to practise, to the utter undoing of many. The said visitors ordered, therefore, that none should practise or exercise that faculty unless he had been examined by the physick professor concerning his knowledge therein. Which order, being of great moment, was the year following confirmed by the king, and power by him granted to the professor and successors to examine those that were to practise according to the Visitor's Order."

PIERRE FRANCO (c. 1560) was a Swiss or French surgeon, and a famous lithotomist, who performed the high operation for the first time in 1560, with success, on a child aged two years. Recognising the dangers of this method, he introduced a new method in the operation known as perineal lithotomy, which was called the lateral method. He preceded Paré in improvements in dealing with strangulated hernia by the operation known as herniotomy. He was one of the first to re-introduce into midwifery practice the operation known as "turning," in difficult labour. The operation was a familiar one amongst the Hindus, and had been known to the later Græco-Roman school, but had fallen into disuse until Paré, Franco, and Guillemeau devoted themselves to the improvement of this neglected branch of the healing art with great success.

ANDREW LIBAVIUS (1546-1616), physician at Coburg, is said by

¹ *Hist. Oxford*, vol. ii. p. 62.

Sprengel to have been the person who began to cultivate chemistry, as distinct from all theosophical fancies of his predecessors.

CONRAD GESNER, the miracle of learning, whom we have already mentioned, devoted great attention to gynæcology, and wrote learnedly and without prejudice upon medicine.

DR. HENRY ALKINS (born 1558) was one of the principal physicians of James I. While president of the Royal College, the first London Pharmacopœia was published in 1618.

JOHN BANNISTER was a voluminous writer on surgery who practised in London, and wrote a treatise on surgery in 1575.

THOMAS GALE (1507–1586), the “English Paré,” was a military surgeon, under Henry VIII. and Elizabeth, who taught that gun-shot wounds were not poisoned as was commonly supposed, but were to be treated as ordinary wounds.

WILLIAM BULLEYN (died 1576) was a famous physician and botanist in the reigns of the later Tudors. He wrote *The Government of Health* (1548), *Book of Simples*, and other works.

FRESCATORIUS (1483–1553) was the first to publish a description of typhus fever. Dr. Mead says¹ that he knew that “consumption is contagious, and is contracted by living with a phthysical person, by the gliding of the corrupted and putrified juices [of the sick] into the lungs of the sound man.” He *inferred* the microbes which we *see*.

G. BAILLOU (1536–1614) was the first to describe clearly the diseases whooping cough and croup.

ALEXANDER BENEDETTI (died 1525) was an anatomist, who made important observations on gall-stones.

FELIX PLATTER (1536–1614), a professor at Basle, must ever be gratefully remembered for his humane and wise opposition to the cruel treatment of the insane by coercive measures, which unhappily were in fashion up to recent times. He suggested the division of diseases into three classes: (1) Mental disorders; (2) Pains, fevers, etc.; (3) Deformities and defects of secretion.

A book which contains directions for identifying simples and preparing compound medicines is called a Pharmacopœia. The first work of this character, which was published under Government authority, was that of Nuremberg, in 1512. A student, VALERIUS CORDUS, passing through the city, exhibited a recipe book, which he had compiled from the writings of the most eminent physicians of the town. He was urged to print it for the benefit of the apothecaries. The College of Medicine at Florence issued the *Antidotarium Florentinum*, somewhat earlier,

¹ *De morbis contagiosis*, lib. ii. cap. ix.

but merely on its own authority. Dr. A. Foes used the term *pharmacopœia* first as a distinct title for his work published at Basle, in 1561.¹

COSTANZO VAROLIUS of Bologna (1545-1575), one of the greatest of the Italian anatomists, described the optic nerves and many important points in the anatomy of the brain.

VOLCHER COITER, of Groningen (1534-1600), was a pupil of Fallopius and Eustachius, who was distinguished for his important researches on the cartilages, bones, nerves, and the anatomy of the foetal skeleton.

FABRICIUS, of Acquapendente (1537-1619), a pupil of Fallopius, and a distinguished anatomist, made important researches on the structure of animals in general. His famous discovery of the valves of the veins and his investigations concerning their use led Harvey to make the discovery of the circulation of the blood.

CASSERIUS (1561-1616) investigated the anatomy of the vocal organs, discovered the muscles of the ossicles of the ear, and practised bronchotomy, which he had learned from Fabricius. He was professor at Padua, and a teacher of Harvey.

SPIGEL (1578-1625) made researches on the liver, a lobulus of which bears his name.

OLAUS WORM (1588-1654) first described the small bones of the skull, now called "Wormian" bones.

It was not till the sixteenth century that France contributed her quota to the list of great anatomists. Nothing shows more clearly the difficulty with which learning was spread in the times of which we write than the fact that the works of the early Italian anatomists were altogether unknown in France until a hundred years after they were written.

JACQUES DUBOIS (1478-1555) taught anatomy at Paris, and was professor of surgery to the Royal College. He was an irrational admirer of Galen. The carcasses of dogs and other animals were the materials from which he taught; it does not appear that it was possible to obtain human subjects for dissection without robbing the cemeteries.

CHARLES ETIENNE (1503-64) was the first to detect valves in the orifices of the hepatic veins. He knew nothing of the researches of Achillini concerning the brain, although they were made sixty years before; yet his investigations of the structure of the nervous system were most important, and his demonstration of the existence of a canal running through the whole length of the spinal cord, which had not previously been suspected, entitles him to a high place in the history of anatomy.

¹ *Ency. Brit.*

A new era in the history of anatomy was inaugurated by the appearance of ANDREW VESALIUS (1514-1564), a Fleming, who pursued the study with the greatest assiduity at Venice, and demonstrated it at Padua before he was twenty-two. He remained there seven years, then went to Bologna and thence to Pisa. He is known as the first author of a systematic and comprehensive view of human anatomy. He recognised the necessity of divesting the science of the current misrepresentations of ignorance and fancy.

Vesalius especially contributed to our knowledge of the circulatory organs; it was he who, by his study of the structure of the heart and the mechanism of its valves, stimulated his pupils and fellow-students to pursue a course of research which ended at last in Harvey's immortal discovery. Besides these researches on the vascular system, he first accurately described the sphenoid bone and the sternum. He described the omentum, the pylorus, the mediastinum and pleura, and gave the fullest description of the brain which, up to that time, had appeared. Splendid as were his researches, and valuable as were his writings, it was perhaps by the way in which he stimulated inquiry in others that he rendered the greatest services to anatomical science.

Dr. Molony, writing in the *British Medical Journal*, December 31, 1892, says: "I recently secured possession of his works, entitled *Andree Vesalii Invictissimi Caroli V. Imperatoris Medici Opera Omnia*. It is a curious work in two immense folio volumes, written in fairly good Latin. It has several plates representing the surgical instruments of the period, dissections, and, it must be added, quadrupeds of all sorts tied up evidently awaiting vivisection.

"The preface consists of a lengthy and appreciative life of Vesalius, from which it seems that he was born in 1514, at Brussels, where his father was court physician. As a boy he seems to have shown a taste for comparative anatomy, 'puer animalium penetralia nudare atque viscera inspicere soleret.' His anatomical studies were at all times pursued under difficulties. He obtained the bodies of criminals by bribing the judges, 'corpora nactus eorum, in cubicula vexit, suosque in usus per tres et ultra septimanas asservavit. Horretne legenti animus? O juvenilis ardor, repagula eluctatur ferrea! Tali opus erat ingenio, artibus bis, at nobile conderet opus.' He does not seem to have been married, if we may judge from the following extract: 'Aetate vero integra, uxore, liberis, rei familiaris omni cura liber, totum se immersit in anatomicis.'

"Vesalius was an enthusiastic surgeon, and apparently looked down upon the physicians of the period: 'Jocatus medicos reliquos syrupis præscribendis unice occupari.' His success aroused the jealousy of his

contemporaries. Among others he came into collision with Sylvius of Paris, Eustachius of Rome, and Fallopius of Padua. Mention is also made of 'Joannis Caji Medici celebris Britanni.' It would be interesting to ascertain who this was. [No doubt it was Caius.]

"The end of Vesalius was tragic enough. 'Hispanum curabat nobilem petiit ab amicis defuncti corpus aperire ut mortis scrutaretur causam. Quo concesso, visum cor in aperto jam pectore adhuc palpitans.' The punishment ordered for this was a pilgrimage to Jerusalem. On his return voyage he was wrecked on the island of Zacynthus. 'Inops, in loco solitario, omnique carens subsidio miserabiliter vitam finivit 1564.'"

"VESALIUS," says Portal, "appears to me one of the greatest men who ever existed. Let the astronomers vaunt their Copernicus, the natural philosophers their Galileo and Torricelli, the mathematicians their Pascal, the geographers their Columbus, I shall always place Vesalius above all their heroes. The first study for man is man. Vesalius has this noble object in view, and has admirably attained it; he has made on himself and his fellows such discoveries as Columbus could only make by travelling to the extremity of the world. The discoveries of Vesalius are of direct importance to man; by acquiring fresh knowledge of his own structure, man seems to enlarge his existence; while discoveries in geography or astronomy affect him but in a very indirect manner."

The zeal of Vesalius and his fellow-students of anatomy often led them to weird adventures. Hallam says; ¹ "they prowled by night in charnel-houses, they dug up the dead from the graves, they climbed the gibbet, in fear and silence, to steal the mouldering carcase of the murderer; the risk of ignominious punishment, and the secret stings of superstitious remorse, exalting no doubt the delight of these useful but not very enviable pursuits." Vesalius, as has been said above, was once absurdly accused of dissecting a Spanish gentleman before he was dead. He only escaped the punishment of death by undertaking a pilgrimage to Jerusalem, during which he was shipwrecked, and died of famine in one of the Greek islands.²

GABRIEL FALLOPIUS (1523-1562) was a prominent pupil of Vesalius who studied the anastomoses (the blending together) of the blood-vessels. His researches in the anatomy of the bones and the internal ear greatly advanced anatomical knowledge. He discovered the tubes connected with the womb, called after him the "Fallopian tubes." Fallopius is described as a savant distinguished by his sense of justice, his modesty

¹ *Literature of Europe*, chap. ix. sect. 2, 13.

² Portal, *Tiraboschi*, ix. 34.

and gentleness; yet Dr. Baas says,¹ "the fact that even Fallopio did not shrink from accepting the gift of some convicts, and then poisoning them—indeed, when the first experiment proved a failure, he tried it again with better success—is characteristic of the zeal of the age in the investigation of the human body, and of the barbarous idea that might makes right towards those guilty before the law!"

EUSTACHIUS was a contemporary of Vesalius. He divides with him the honour of having created the science of human anatomy. His name is perpetuated by the tube in the internal ear, called the "Eustachian tube." His researches on the anatomy of the internal part of the organ of hearing, his studies in the anatomy of the teeth, in which he was the pioneer, his famous *Anatomical Engravings*, and his labours in connection with the intimate structure of the organs of the body, taken in connection with their relative anatomy, prove that he laboured for the advancement of the knowledge of the structure of the human frame with the utmost assiduity and success.

J. C. ARANZI (1530–1589), of Bologna, gave the first correct account of the anatomy of the foetus, and his description of that of the brain is exceedingly minute and lucid. He named the *hippocampus*, described the choroid plexus, and the fourth ventricle under the name of the *cistern of the cerebellum*.

COLUMBUS (died 1559) was a pupil of Vesalius, whom he succeeded in the chair of anatomy at Padua. He had a glimpse of how the blood passes from the right to the left side of the heart, but he had no true knowledge of the circulation.

MICHAEL SERVETUS (1511–1553) was either a pupil or fellow-student of Vesalius, who, in 1553, described accurately the pulmonary circulation. He recognised that the change from venous into arterial blood took place in the lungs, and not in the left ventricle. He was a pioneer in physiological science by his great discovery of the respiratory changes in the lungs.

LEVASSEUR (about 1540), says Hallam,² appears to have known the circulation of the blood through the lungs, the valves of the veins, and their direction and purpose.

GASPARÉ TAGLIACOZZI (1546–1599) was a professor at Bologna, whose name is famous in the history of surgery from his skill in performing "plastic operations." Rhinoplastic operation is a term in surgery sometimes synonymous with the Taliacotian operation, which is a process for forming an artificial nose. It consists in bringing down a piece of flesh from the forehead, and while preserving its attachment to the living

¹ *Hist. Med.*, p. 427.

² *Lit. of Europe*, chap. ix. sect. 2.

structures, causing it to adhere to the anterior part of the remains of the nose. Tagliacozzi, himself, to replace the lost substance employed the skin of the upper part of the arm, as BRANCA did previously. Patients flocked to him from all parts of Europe. The world was, as usual, ungrateful; the great surgeon was considered to have presumptuously interfered with the authority of Providence. Noses and lips which the Divinity had destroyed as a punishment for the sins of men had been restored by this daring man. After his death some nuns heard voices in their convent crying for several weeks: "Tagliacozzi is damned!" By the direction of the clergy of Bologna his corpse was taken from the grave and re-interred in unconsecrated ground.¹ We are not in a position to sneer at this, for the preachers of the nineteenth century said something very similar of the use of chloroform in midwifery only a few years ago. In 1742 the Faculty of Paris declared Tagliacozzi's operation impossible; but the English journals, in 1794, discovered that such a method of surgical procedure had been in use in India from ancient times, and then the scientific world tried the experiment and succeeded perfectly.

AMBROISE PARÉ, "the father of French surgery" (1509-1590), availed himself of the opportunities offered him in military surgery during the campaign of Francis I. in Piedmont. It was the practice of the time to treat gunshot wounds with hot oil—a treatment which Paré revolutionized by using merely a simple bandage.

In 1545 he attended the lectures of Sylvius at Paris, and became prosector to that great anatomist. His book on *Anatomy* was published five years later. By his employment of the ligature for large arteries, he was able so completely to control hæmorrhage that he was able to practise amputation on a larger scale than had before been attempted. Paré is considered as the first who regularly employed the ligature after amputation. He declares in his *Apologie* that the invention was due to the ancients, and he explains their use of it, although he ascribes to inspiration of the Deity his own first adoption of the practice.

The PHILOSOPHER RAMUS in 1562 urged Charles IX. of France to establish schools for clinical teaching, such as already existed at Padua.

ROBERT FLUDD, M.D., or in the Latin style he affected, ROBERTUS DE FLUCTIBUS, was born in 1574; he was an ardent supporter of the Rosicrucian philosophy. He had a strong leaning towards chemistry, but had little faith in orthodox medicine. His medical ideas consisted of a mysterious mixture of divinity, chemistry, natural philosophy, and metaphysics.

In 1573 Harrison, in his unpublished *Chronologiæ*, remarks that

¹ Puschmann's *Hist. Med. Education*, p. 305.

"these daies the taking in of the smoke of the Indian herb called tabaco, by an instrument like a little ladell, is gretly taken up and used in England against rewmes."

It was not till 1576 that croup was well understood. Laënnec thinks it was quite unknown to the Greek and Arabian physicians; but Forbes says that it was known to Hippocrates and Aretæus, although its pathology was not understood. Ballonius was the first who accurately described the false membrane, which is a characteristic of the disease.¹

At the Reformation in England under Elizabeth, some of the Catholic priests who refused to conform to the new religion sought in other professions the means of living. In a curious old book, *Tom of all Trades, or the Plaine Pathway to Preferment*, by Thomas Powell (printed 1631), there is a story which no doubt was founded in fact. "And heere I remember me of an old tale following, *viz.*, At the beginning of the happy raigne of our late good Queene *Elizabeth*, divers Commissioners of great place, being authorized to enquire of, and to displace, all such of the *Clergie* as would not conforme to the reformed *Church*, one amongst others was Conuented before them, who being asked whether he would subscribe or no, denied it, and so consequently was adiudged to lose his benefice and to be deprived his function; wherevpon, in his impatience, he said, 'That if they (meaning the Commissioners) held this course it would cost many a man's life.' For which the Commissioners called him backe againe, and charged him that he had spoke treasonable and seditious words, tending to the raysing of a rebellion or some tumult in the Land; for which he should receive the reward of a Traytor. And being asked whether hee spake those words or no, he acknowledged it, and tooke vpon him the Iustification thereof; 'for, said he, 'yee have taken from me my liuing and profession of the Ministrie; Schollership is all my portion, and I have no other meanes now left for my maintenance but to turn *Phisition*; and before I shalbe absolute Master of that Misterie (God he knowes) how many mens lives it will cost. For few *Phisitions* vse to try experiments vpon their owne bodies.'

"With vs, it is a Profession can maintaine but a few. And diuers of those more indebted to opinion than learning, and (for the most part) better qualified in discoursing their trauailes than in discerning their patients malladies. For it is growne to be a very huswiues trade, where fortune preuailes more than skill."

A writer in Hood's *Every-Day Book*, on the date February 25, says that the monks knew of more than three hundred species of medicinal plants which were used in general for medicines by the

¹ Laënnec, *Diseases of the Chest, etc.*, p 112.

religious orders before the Reformation. The Protestants, the more efficiently to root out Popery, changed the Catholic names of many of these. Thus the *virgin's bower* of the monastic physician was changed into *flammula Jovis*; the *hedge hyssop* into *gratiola*; *St. John's wort* became *hypericum*; *fleur de St. Louis* was called *iris*; *palma Christi* became *ricinus*; *Our Master wort* was christened *imperatona*; *sweet bay* they called *laurus*; *Our Lady's smock* was changed into *cardamine*; *Solomon's seal* into *convallaria*; *Our Lady's hair* into *trichomanes*; *balm* into *melissa*; *marjoram* into *origanum*; *herb Trinity* into *viola tricolor*; *knee holy* into *rascus*; *rosemary* into *rosmarinus*; *marygold* into *calendula*; and a hundred others. But the old Catholic names cling to the plants of the cottage garden, and *Star of Bethlehem* has not quite given place to *ornithogalum*; *Star of Jerusalem* to *goat's beard*; nor *Lent lily* to *daffodil*.

The gullibility of mankind has never been exhibited in a clearer light than JOHANN VALENTIN ANDREÆ (1586-1654) succeeded in showing in his elaborate joke of the SOCIETY OF THE ROSY-CROSS. In 1614 a famous but entirely fabulous secret society set the scholars of Europe discussing the pretensions of the Rosicrucians, who were said to have derived their origin from one CHRISTIAN ROSENKREUZ, two hundred years previously. This philosopher, it was said, had made a pilgrimage to the East, to learn its hidden wisdom, of which the art of making gold was a portion. The character of the society was Christian, but anti-Catholic, and its ostensible objects were the study of philosophy and the gratuitous healing of the sick. 'Its device was a cross, with four red roses. Andreæ was a learned man, but jocular withal; for no sooner had the public eagerly swallowed his story, than he confessed the whole was pure invention, and that he had originated the idea with the view of ridiculing the alchemists and Theosophists, whose opinions were dominating European society. The public, however, liked the idea so well that it developed and flourished, and a society was established called *Fraternitas Rosæ Crucis*. The most celebrated followers of the Rosicrucians were Valentine Wiegel, Jacob Boehm, Egidius Gutman, Michael Mayer, Oswald Crollius, and Robert Fludd.¹

De Quincey has traced the connection between the Rosicrucians and Freemasons. "Rosicrucianism," he says, "it is true, is not Freemasonry, but the latter borrowed its form from the first."²

Scrofula was anciently treated in a superstitious manner by the sovereigns of England and France by imposition of hands. This ceremony is said to have been first performed by Edward the Confessor

¹ Meryon, *Hist. Med.*, vol. i. p. 467.

² *Works*, vol. xiii. p. 394.

(1042-1066). A special "Service of Healing" was used in the English Church in the reign of Henry VIII. (1484-1509).

The ceremonies of blessing cramp-rings on Good Friday, called the Hallowing of the Cramp-Rings, is described by Bishop Percy in his *Northumberland Household Book*,¹ where we have the following account :—

"And then the Usher to lay a Carpett for the Kinge to Creepe to the Crosse upon. And that done, there shal be a Forme sett upon the Carpett, before the Crucifix, and a Cushion laid upon it for the King to kneale upon. And the Master of the Jewell Howse ther to be ready with the Booke concerninge the Hallowing of the Crampe Rings, and Amner (Almoner) muste kneele on the right hand of the Kinge, holdinge the sayde booke. When that is done the King shall rise and goe to the Alter, wheare a Gent. Usher shall be redie with a Cushion for the Kinge to kneele upon; and then the greatest Lords that shall be ther to take the Bason with the Rings and beare them after the Kinge to offer."

In the Harleian Manuscripts there is a letter from Lord Chancellor Hatton to Sir Thomas Smith, dated Sept. 11th, 158-, about a prevailing epidemic, and enclosing a ring for Queen Elizabeth to wear between her breasts, the said ring having "the virtue to expell infectious airs."²

Andrew Boorde, in his *Introduction to Knowledge* (1547-48), says: "The Kynges of England by the power that God hath gyuen to them, dothe make sicke men whole of a sickeness called the kynges euyll. The Kynges of England doth halowe euery yere crampe rynges, the whyche rynges, worne on ones synger, dothe helpe them the whyche hath the crampe."³

Concerning the king's evil, which Boorde explains is an "euyl sickenes or impediment," he advises: "For this matter let euery man make frendes to the Kynges maiestie, for it doth pertayne to a Kynge to helpe this infirmitie by the grace the whiche is geuen to a Kynge anyoynted."⁴

In Robert Laneham's letter⁵ about Queen Elizabeth's visit to Kenilworth Castle, it is told how on July 18th, 1575, her Majesty touched for the evil, and that it was "a day of grace." "By her highnes accustomed mercy and charitee, nyne cured of the peynfull and daungerous diseaz, called the kings euill; for that Kings and Queenz of this Realm

¹ p. 436, ed. 1827.

² Brand's *Popular Antiquities*, vol. iii. p. 160.

³ Furnivall's ed. *Boorde*, Early English Text Society, 1870, p. 121.

⁴ *Breviary of Health*, fol. 80b.

⁵ In Dr. Furnivall's *Captain Cox*, published for the Ballad Society, 1891, p. 35.

withoout oother medsin (saue only by handling and prayerz) only doo cure it."

Sir John Fortescue, in his defence of the House of Lancaster against that of York, argued that the crown could not descend to a female because the Queen is not qualified by the form of anointing her to cure the disease called the king's evil. On this account, and more especially after the excommunication of Elizabeth by the Pope in 1570, it must have been eminently comforting to all concerned to find that the power to cure disease by the royal touch had not been affected by the change of religion or any other cause. The practice was at its height in the reign of Charles II.¹

Lord Braybrooke says,² "In the first four years after his restoration he 'touched' nearly 24,000 people." We find that Dr. Johnson was touched by Queen Anne. "The Office for the Healing" continued to be printed in the Book of Common Prayer after the accession of the House of Hanover.

The custom evidently arose from the fact that Edward the Confessor was a saint as well as a king. William of Malmesbury gives the origin of the royal touch in his account of the miracles of Edward: "A young woman had married a husband of her own age, but having no issue by the union, the humours collecting abundantly about her neck, she had contracted a sore disorder, the glands swelling in a dreadful manner. Admonished in a dream to have the part affected washed by the king, she entered the palace, and the king himself fulfilled this labour of love, by rubbing the woman's neck with his fingers dipped in water. Joyous health followed his healing hand; the lurid skin opened, so that worms flowed out with the purulent matter, and the tumour subsided. But as the orifice of the ulcers was large and unsightly, he commanded her to be supported at the royal expense till she should be perfectly cured. However, before a week was expired, a fair new skin returned, and hid the scars so completely, that nothing of the original wound could be discovered; and within a year becoming the mother of twins, she increased the admiration of Edward's holiness. Those who knew him more intimately, affirm that he often cured this complaint in Normandy; whence appears how false is their notion, who in our times assert, that the cure of this disease does not proceed from personal sanctity, but from hereditary virtue in the royal line."³

Many other miracles of healing were attributed to St. Edward. Jeremy Collier⁴ maintains that the scrofula miracle is hereditary upon

¹ Evelyn's *Diary*, vol. ii. p. 151.

² Notes to *Pepys' Diary*, vol. i. p. 90.

³ *William of Malmesbury's Chronicle*, Book II. chap. 13.

⁴ *Ecclesiastical History of Great Britain*, vol. i. p. 225.

all his successors. The curious fact, however, is that the hereditary right of succession was repeatedly interrupted, yet the power remained. In connection with this royal touching, pieces of gold were given by the sovereigns to be worn by the patients as amulets. They were called "touching pieces," and though not absolutely requisite for the cure, some persons declared that the disease returned if they lost the coins. We can only account for the great efficacy which in some cases seemed to have attended the royal treatment, by the confidence and exalted expectation awakened in the sufferers by the ceremony, which acted as a tonic to the system, and roused the patients' imagination to contribute to their own cure.¹

Chips and handkerchiefs dipped in the blood of King Charles I. are said to have been efficacious in curing sick persons in hundreds of cases.

The College of Physicians of Edinburgh was created by the king's letters patent in 1581, one year after the foundation of Edinburgh University by James VI.

In the reign of Elizabeth, when physicians rode on horseback, they were seated sideways; many of them carried muffs, to keep their fingers warm when they had to feel their patient's pulse. Twice a year everybody was bled—a system which must have caused many disorders.

Fifteen centuries after the age of CELSUS, with the revival of learning and science came the revival of human vivisection. VESALIUS, as above mentioned, is known to have vivisected men; and in the *Storia Universale* of CESARE CANTÙ there is an account of the DUKE OF FLORENCE giving a man for vivisection to FALLOPIUS. This incident has been disputed; but the following series of cases, extracted by Professor ANDREOZZI from the Criminal Archives of Florence, and published by him in his book *Leggi Penali degli antichi e Cinesi*, are beyond question. COSMO DE MEDICI seems to have taken the anatomists of Pisa under his special favour, and to have sent them the miserable convicts from the prisons at his option. The following examples are a selection from the cases extracted by Signor ANDREOZZI from the *Archivio Criminale*:—

"1. January 15th, 1545.—SANTA DI MARIOTTO TARCHI DI MUGELLO, wife of BASTIANO LUCCHESI, was condemned to be beheaded for infanticide. Under the sentence is written, 'Dicta Santa, de mente Excell^m Ducis, fuit missa Pisis, de ea per doctores fieret notomia.' [No notice to be found of any execution of the woman, such as would have appeared had she been put to death before she was sent to Pisa.]

"2. December 14th, 1547.—GIULIO MANCINI SANESE was condemned

¹ See for a complete history of the royal gift of healing Pettigrew's *Medical Superstitions*, p. 117.

for robbery and other offences. Sent to Pisa to be anatomised. 'Ducatur Pisis, pro faciendo de eo notomia.'

"3. In the record of prisoners sent away, dated September 1st, 1551, occurs this entry:—'Letter to the Commissioner of Castrocaro, that MADDALENA, who is imprisoned for killing her son, should be sent here, if she be likely to recover, as it pleases S. E. that she should be reserved for anatomy. Of this nothing is to be said, but she is to be kept in hopes. If she is not likely to recover, the executioner is to be sent for to decapitate her.' The end of the horrible extract is,—'Went to Pisa, to be made an anatomy.'

"4. December 12th, 1552.—A man named ZUCCHERIA, accused of piracy, was reserved from hanging, with his comrade, and sent to Pisa, 'per la notomia.'

"5. December 22nd, 1552.—A certain ULIVO DI PAOLO was condemned by the Council of Eight to be hanged for poisoning his wife. Sentence changed—to be sent for anatomy. Was sent to Pisa on January 13th.

"6. November 14th, 1553.—MARGUERITA, wife of BIAJIO D'ANTINORO, condemned to be beheaded for infanticide. . . . December 20th, 'she was released from the fetters and consigned to a familiar, who took her to Pisa to the Commissario, *who gave her, as usual, to the anatomist, to make anatomy of her*; which was done' ('che la consegnì, secondo il solito, al notomista, per farne notomia, come fu fatto')."

"Several other cases, from 1554 to 1570, are recorded, with equally unmistakable exactitude. In one instance the condemned man's destiny was mitigated, and after having been ordered to be sent to Pisa for the Commissario to consign to the anatomist, 'when he should ask for him, and at his pleasure,' he was mercifully sentenced to be hanged at once at Vico, 'by direction of Sua Eccellenza Illustrissima.' Two unfortunate thieves, PAOLI DI GIOVANNI and VESTRINO D'AGNOLO, were sent together by the Council of Eight to be anatomised; the Duke having written to say 'that they wanted in Pisa a subject for anatomy.'"

After the date 1570 no more cases occur in the Archives.

Francis I. invited the Italian anatomist VIDUS VIDIVS to his royal college at Paris.

Several new medicines were introduced about this period.

Lemon juice was first spoken of as a remedy for scurvy in 1564. Its use was discovered by some Dutch sailors whose ship was laden with lemons and oranges from Spain.¹

The virtues of sassafras as a medicine for scurvy were discovered, according to Cartier, in 1536, on a voyage to explore the coast of

¹ Meryon, *Hist. Med.*, vol. i. p. 423.

Newfoundland and the St. Lawrence. The natives advised the sailors afflicted with the malady to use the wood of the tree ameda, which was thought to have been sassafras.¹

Sarsaparilla was first brought to Europe by the Spaniards, in the middle of the sixteenth century, from Peru and Brazil.

Guaiacum was introduced into Europe in 1509, and in 1519 its use became common.

Holinshed complained² that estimation and credit given to compound medicines made with foreign drugs in his time was one great cause of the prevailing ignorance of the virtues and uses of "our own simples," which he held to be fully as useful as the "salsa parilla, mochoacan, etc.," so much in request. "We tread those herbs under our feet, whose forces, if we knew and could apply them to our necessities, we would honour and have in reverence.—Alas! what have we to do with such Arabian and Grecian stuff as is daily brought from those parts which lie in another clime?—The bodies of such as dwell there are of another constitution than ours are here at home. Certes, they grow not for us, but for the Arabians and Grecians.—Among the Indians, who have the most present cures for every disease of their own nation, there is small regard of compound medicines, and less of foreign drugs, because they neither know them nor can use them, but work wonders even with their own simples."

CARLO RUINI, of Bologna, published in 1598 a work on the anatomy of the horse, in which Ercolani has found evidence that he, to some extent, anticipated Harvey's discovery.³

NICHOLAS HOUEL (1520-1585) was born at Paris, 1520. He was a famous and learned pharmacien, who devoted the fortune which he acquired by his industry and skill to philanthropic and scientific purposes. He founded a great orphanage in Paris, and the School of Pharmacy of that city owes its origin to him. He wrote a *Treatise on the Plague*, and one on the *Theriacum of Mithridates*, both published in 1573. It is to his enlightened and charitable suggestion that dispensaries arose in Paris. His "Garden of Simples" inspired the creation of the *Jardin des Plantes*.⁴

Even at the close of the sixteenth century careful and sober men, as Mr. Henry Morley says,⁵ believed in the miraculous properties of plants and animals and parts of animals. When the century commenced, the learned and unlearned alike believed in the influences of the stars and the interferences of demons with diseases, and in the mysteries of magic.

¹ Hakluyt's *Voyages*, vol. iii. p. 280.

² *Description of England*, chap. xix.

³ See Gamgee, "Third Historical Fragment," in *Lancet*, 1876.

⁴ Cap. *Études Biographiques*, sec. i. pp. 84-89. ⁵ *Cornelius Agrippa*, vol. i. p. 62.

The reason why students of such sciences as existed were punished and persecuted was the dread which men had that the knowledge of the occult powers of nature would afford the learner undue and mysterious power over them.

LEGAL MEDICINE.

That most important branch of medical science known as Medical Jurisprudence, or Forensic Medicine, first took its rise in Germany, and, later, was recognised as a necessary branch of study in England. Briefly this science may be described as "that branch of State medicine which treats of the application of medical knowledge to the purposes of the law." It embraces all questions affecting the civil or social rights of individuals, and of injuries to the person. Although we find traces of the first principles of this science in ancient times, especially in connection with legitimacy, feigned diseases, etc., it is by no means certain that even in Rome the law required any medical inspection of dead bodies. The science dates only from the sixteenth century. The Bishop of Bamberg, in 1507, introduced a penal code requiring the production of medical evidence in certain cases. In 1532, Charles V. induced the Diet of Ratison to adopt a code in which magistrates were ordered to call medical evidence in cases of personal injuries, infanticide, pretended pregnancy, simulated diseases, and poisoning. The actual birth of forensic medicine, however, did not take place until the publication, in Germany, in 1553, of the *Constitutio Criminalis Carolina*.¹ The difficulties which the infant science had to contend against may be estimated from the fact that a few years later a physician named Weiker, who declared that witches and demoniacs were simply persons afflicted with hypochondriasis and hysteria, and should not be punished, was with difficulty saved from the stake by his patron, William, Duke of Cleves.

AMBROSE PARÉ wrote on monsters, simulated diseases, and the art of drawing up medico-legal reports.

In 1621-35 Paulo Zacchia, of Rome, published a work entitled *Quæstiones Medico-Legales*, which inaugurated a new era in the history of Forensic Medicine. He exhibited immense research in this classical work, the materials for which he collected from 460 authors. Considering that chemistry and physiology were then so imperfectly understood, such a work is a proof of the learning and sagacity of the author.

In 1663 the Danish physician Bartholin proposed the hydrostatic test for the determination of live-birth, the method used to-day in examining the lungs of an infant to discover whether the child was born alive or not, by observing whether they float or sink in water.

¹ *Ency. Brit.*, vol. xv. p. 782.

CHAPTER II.

THE SEVENTEENTH CENTURY.

Bacon and the Inductive Method.—Descartes and Physiology.—Newton.—Boyle and the Royal Society.—The Founders of the Schools of Medical Science.—Sydenham, the English Hippocrates.—Harvey and the Rise of Physiology.—The Microscope in Medicine.—Willis and the Reform of *Materia Medica*.

THE seventeenth century is important in the history of medicine as the era of the two greatest discoveries of modern physiology—the circulation of the blood, and the development of the higher animals from the egg (ovum). Both of these are due to Harvey, and both were made in the midst of the troubles of the great Civil War. The history of medicine is so interwoven at this important period with that of science and philosophy in general, that it is necessary to glance awhile at the great factors which were working out the advancement of medical learning.

Amongst the greatest figures on the scientific stage at the beginning and middle of the seventeenth century are the following:—

FRANCIS BACON (1561–1626) was the great leader in the reformation of modern science, and shares with Descartes the glory of inaugurating modern philosophy. His great work, the *Novum Organon*, was given to the world just as authority and dogmatism had been discarded from scientific thought, and the era of experiment had begun. It was not Bacon's contributions to science, not his discoveries, which entitle him to the highest place in the reformation of science, but the general spirit of his philosophy and his connected mode of thinking, his insistence upon the need for rejecting rash generalization, and analysing our experience, employing hypothesis, not by guess work, but by the scientific imagination which calls to its assistance experimental comparison, verification, and proof. Bacon's philosophy of induction was reared upon a foundation of exclusion and elimination. He relegated theological questions to the region of faith, insisting that experience and observation are the only remedies against prejudice and error.¹

¹ See the article on Bacon in *Ency. Brit.*, vol. iii. p. 217.

The publication of Bacon's *Novum Organon* in 1620 resulted in the formation of a society of learned men, who met together in London in 1645 to discuss philosophical subjects and the results of their various experiments in science. They are described as "inquisitive," a term which aptly illustrates the temper of the times. Taking nothing upon trust, these men inquired for themselves, and left their books to make experiment, as Bacon had urged students of nature to do. About 1648-9 DRs. WILKINS, WALLIS, and others removed to Oxford, and with SETH WARD, the HON. ROBERT BOYLE, PETTY, and other men of divinity and physic, often met in the rooms of DR. WILKINS at Wadham College, and so formed the Philosophical Society of Oxford, which existed only till 1690. About 1658 the members were dispersed, the majority coming to London and attending lectures at Gresham College. Thus, in the midst of civil war, thoughtful and inquiring minds found a refuge from the quarrels of politicians and the babel of contending parties in the pursuit of knowledge and the advancement of research. The Royal Society was organized in 1660, and on 22nd April, 1662, Charles II. constituted it a body politic and corporate. The *Philosophical Transactions* began 6th March, 1664-5. In 1668 Newton invented his reflecting telescope, and on 28th April, 1686, presented to the Society the MS. of his *Principia*, which the council ordered to be printed.

RENE DESCARTES (1596-1650), the philosopher, applied himself to the study of physics in all its branches, but especially to physiology. He said that science may be compared to a tree; metaphysics is the root, physics is the trunk, and the three chief branches are mechanics, medicine, and morals,—the three applications of our knowledge to the outward world, to the human body, and to the conduct of life.¹ He studied chemistry and anatomy, dissecting the heads of animals in order to explain imagination and memory, which he believed to be physical processes.² In 1629 he asks Mersenne to take care of himself, "till I find out if there is any means of getting a medical theory based on infallible demonstration, which is what I am now inquiring."³ Descartes embraced the doctrine of the circulation of the blood as discovered by Harvey, and he did much to popularise it, falling in as it did with his mechanical theory of life. He thought the nerves were tubular vessels which conduct the animal spirits to the muscles, and in their turn convey the impressions of the organs to the brain. He considered man and the animals were machines. "The animals act naturally and by springs, like a watch."⁴ "The greatest of all the prejudices we have retained from our infancy is that of believing that

¹ *Cœuvres*, iii. 24.

² *Ibid.*, vi. 89.

³ *Ibid.*, vi. 234.

⁴ *Ibid.*, ix. 426.

the beasts think.”¹ Naturally such a monstrous theory did much to encourage vivisection, a practice common with Descartes.² “The recluses of Port Royal,” says Dr. Wallace,³ “seized it eagerly, discussed automatism, dissected living animals in order to show to a morbid curiosity the circulation of the blood, were careless of the cries of tortured dogs, and finally embalmed the doctrine in a syllogism of their logic: no matter thinks; every soul of beast is matter, therefore no soul of beast thinks. He held that the seat of the mind of man was in that structure of the brain called by anatomists the pineal gland.”

MALEBRANCHE (1638–1715) was a disciple of Descartes, who thought his system served to explain the mystery of life and thought. In his famous *Recherche de la Verite* he anticipated later discoveries in physiology, e.g., Hartley’s principle of the interdependence of vibrations in the nervous system and our conscious states.

BLAISE PASCAL (1623–1662), as a natural philosopher, rendered great services to science. The account of his experiments, written in 1662, on the equilibrium of fluids, entitles him to be considered one of the founders of hydrodynamics. His experiments on the pressure of the air and his invention for measuring it greatly assisted to advance the work begun by Galileo and Torricelli. Not only in the great work done, but in those which were undertaken in consequence of his inspiration, we recognise in Pascal one of the most brilliant scientists of a brilliant age.

HOBBS (1588–1679), the famous author of the *Leviathan*, endeavoured to base all that he could upon mathematical principles. Philosophy, he said, is concerned with the perfect knowledge of truth in all matters whatsoever. If the moral philosophers had done for mankind what the geometricians had effected, men would have enjoyed an immortal peace.

BENEDICT DE SPINOZA (1632–1677), the philosopher, had some medical training. His spirit has had a large share in moulding the philosophic thought of the nineteenth century. Novalis saw in him not an atheist, but a “God-intoxicated man.” His philosophy indeed was a pure pantheism; the foundation of his system is the doctrine of one infinite substance. All finite things are modes of this substance.

SIR ISAAC NEWTON (1642–1727), the greatest of natural philosophers, in the years 1685 and 1686—years for ever to be remembered in the history of science—composed almost the whole of his famous work, the *Principia*.

ROBERT BOYLE (1626–1691), one of the great nature philosophers of

¹ Œuvres, x. 204.

² *Ibid.*, iv. 452 and 454.

³ *Ency. Brit.*, art. “Descartes.”

the seventeenth century, and one of the founders of the Royal Society, published his first book at Oxford, in 1660, entitled *New Experiments, Physico-Mechanical, touching the Spring of Air, and its Effects*. He was at one time deeply interested in alchemy. He was the first great investigator who carried out the suggestions of Bacon's *Novum Organon*. He was a patient researcher and observer of facts.

PIERRE BAYLE (1647-1706), the author of the celebrated *Historical and Critical Dictionary*, was a sceptic, of a peculiar turn of mind. He knew so much concerning every side of every subject which he had considered, that he came to the conclusion that certainty was unattainable.

VAN HELMONT (1578-1644) was one of the most celebrated followers of Paracelsus. He learned astronomy, astrology, and philosophy at Rouvain, then studied magic under the Jesuits, and afterwards learned law, botany, and medicine; but he became disgusted with the pretensions of the latter science when it failed to cure him of the itch. He became a mystic, and attached himself to the principles of Tauler and Thomas à Kempis. Then he practised medicine as an act of charity, till, falling in with the works of Paracelsus, he devoted ten years to their study. He married, and devoted himself to medicine and chemistry, investigating the composition of the water of mineral springs. Few men have ever formed a nobler conception of the true physician than Van Helmont, or more earnestly endeavoured to live up to it. Notwithstanding his mysticism, science owes much to this philosopher, for he was an acute chemist. We owe to him the first application of the term "gas," in the sense in which it is used at present. He discovered that gas is disengaged when heat is applied to various bodies, and when acids act upon metals and their carbonates. He discovered carbonic acid. He believed in the existence of an Archeus in man and animals, which is somewhat like the soul of man after the Fall; it resides in the stomach as creative thought, in the spleen as appetite. This Archeus is a ferment, and is the generative principle and basis of life. Disease is due to the Fall of Man. The Archeus influus causes general diseases; the Archei insiti, local diseases: dropsy, for example, is due to an obstruction of the passage of the kidney secretion by the enraged Archeus. Van Helmont gave wine in fevers, abhorred bleeding, and advocated the use of simple chemical medicines.

FRANCIS DE LA BOË (SYLVIUS), (1614-1672) was a physician who founded the Medico-Chemical Sect amongst doctors. Health and disease he held to be due to the relations of the fluids of the body and their neutrality, diseases being caused by their acidity or alkalinity.

THOMAS GOULSTON, M.D. (died 1632), was a distinguished London

physician, who was not less famous for his classic learning and theology than for the practice of his profession. He founded what are known as the Goulstonian lectures, which are delivered by one of the four youngest doctors of the Royal College of Physicians, London. "A dead body was, if possible, to be procured, and two or more diseases treated of."

THOMAS WINSTON, M.D. (born 1575), was professor of physic in Gresham College. His lectures included "an entire body of anatomy," and were considered, when published, as the most complete and accurate then extant in English.

The Anatomy Lecture at Oxford was first proposed to the University on Nov. 17th, 1623, with an endowment of £25 a year stipend. Out of this the reader had "to pay yearly to a skilful Chirurgeon or Dissector of the body, to be named by the said reader, the sums of £3 and £2 more by the year towards the ordering and burying of the body."¹ Dr. Clayton, the King's Professor of Physic, was the first reader, and the first chirurgeon was Bernard Wright.²

GIOVANNI ALFONSO BORELLI (1608-1679), the founder of the Mathematical School of Medicine, which attempted to subject to calculation the phenomena of the living economy, was professor of medicine at Florence. He restricted the application of his system chiefly to muscular motions, or to those which are evidently of a mechanical character. Physiology is exceedingly indebted to this school for many valuable suggestions, and Boerhaave distinctly acknowledged them in his *Institutions*.³

GEORGE JOYLIFFE, M.D. (died 1658), was partly concerned in the discovery of the lymphatics. It is not possible to say precisely to whom the discovery of the lymphatics was due; they seem to have been observed independently about the year 1651 to 1652 by Rudbeck a Swede, by Bartholine a Dane, and by Joyliffe.⁴

A new era in medicine was inaugurated by THOMAS SYDENHAM, M.D. (1624-1689), "the British Hippocrates," whose only standard was observation and experience, and whose faith in the healing power of nature was unlimited. He studied at Oxford, but he graduated at Cambridge. He was the friend of Locke and of Robert Boyle. He was looked upon by the faculty with disfavour as an innovator, because, in his own words to Boyle, he endeavoured to reduce practice to a greater easiness and plainness. His fame as the father of English medicine was posthumous. It was indeed acknowledged in his lifetime

¹ Wood, *Hist. Oxford*, vol. ii. p. 883.

² *Ibid.*

³ See Thomson's *Life of Cullen*, vol. i. p. 212.

⁴ Munk, *Roll of the R.C.P., etc.*, p. 281.

that he rendered good service to medicine by his "expectant" treatment of small-pox, by his invention of his laudanum (the first form of a tincture of opium such as we have it), and for his advocacy of the use of Peruvian bark in agues. Yet his professional brethren were inclined to look upon him as a sectary, and considerable opposition was manifested towards him. Arbuthnot, in 1727, styled him "*Æmulus Hippocrates.*" Boerhaave referred to him as "*Angliæ lumen, artis Phœbum, veram Hippocratici viri speciem.*" He did the best he could to cure his patients without mystery and resort to the traditional and often ridiculous dogmas of the medical craft. Many good stories are extant which illustrate this fact. He was once called to prescribe for a gentleman who had been subjected to the lowering treatment so much in vogue in those days. He found him pitifully depressed. Sydenham "conceived that this was occasioned partly by his long illness, partly by the previous evacuations, and partly by emptiness. I therefore ordered him a roast chicken and a pint of canary." When Blackmore first engaged in the study of medicine, he asked Dr. Sydenham what authors he should read, and was told to study *Don Quixote*, "which," he said, "is a very good book; I read it still." He used to say that there were cases in his practice where "I have consulted my patients' safety and my own reputation most effectually by doing nothing at all."

Sydenham, having long attended a rich man for an illness which had arisen and was kept going chiefly by his own indolence and luxurious habits, at last told him that he could do no more for him, but that there lived at Inverness a certain physician, named Robinson, who would doubtless be able to cure him. Provided with a letter of introduction and a complete history of the "case," the invalid set out on the long journey to Inverness. Arrived at his destination, full of hope and eager expectation of a cure, he inquired diligently for Dr. Robinson, only to learn that there was no such doctor there, neither had there been in the memory of the oldest inhabitant. The gentleman returned to London full of indignation against Sydenham, whom he violently rated for sending him so far on a fool's errand. "But," exclaimed Sydenham, "you are in much better health!" "Yes," replied the patient, "I am now well enough, but no thanks to you." "No," answered Sydenham; "it was Dr. Robinson who cured you. I wished to send you a journey with some object and interest in view; in going, you had Dr. Robinson and his wonderful cures in contemplation; and in returning, you were equally engaged in thinking of scolding me."

The Civil War, which violently upset the speculations and research at Oxford, when, as Antony Wood says, the University was "empty as to scholars, but pretty well replenished with Parliamentary soldiers,"

afforded just that stimulus to thought and that upheaval of dogma and prejudice which were eminently favourable to the advance of medical science. Men had learned to treat old doctrines with little respect for their mere antiquity ; authority was discredited, it was subjected to test, observation and criticism ; men no longer believed those doctrines about God and His counsels which the Fathers and the Church taught them about religion, much less were they inclined to bow to Aristotle and Galen when they dictated to them on medicine. Anciently, when bitten by a mad dog, it was enough for them to believe with the fathers of medicine that it was sufficient for the patient to hold some herb dittany in the left hand, while he scratched his back with the other to ensure his future safety. Men took to thinking for themselves ; the spirit of investigation was aroused ; men's minds, in every condition of society, in every town and village, were aroused to activity. There probably never was a time when there was more activity of thought in Oxford than at this period. The stimulus of collision evoked many sparks of genius, and the Civil War produced at our Universities wholesome disturbance, not destruction of any good things. Sydenham, therefore, was distinctly the product of his age. He does not seem to have been a very learned man, neither, on the other hand, was he wholly untaught. There are not many evidences in his works of very wide reading of medical literature, though he was a sincere admirer of Hippocrates, evidently from a sound acquaintance with his works. Sydenham's first medical work was published in 1666. It consisted of accounts of continued fevers, symptoms of the same, of intermittent fevers and small-pox, and was entitled *Methodus Curandi Febres, Propriis observationibus superstructa*. In it the author maintains that "a fever is Nature's engine which she brings into the field to remove her enemy, or her handmaid, either for evacuating the impurities of the blood, or for reducing it into a *new state*. Secondly, that the true and genuine cure of this sickness consists in such a tempering of the commotion of the blood, that it may neither exceed nor be too languid."¹

It was about this period that Peruvian bark was first introduced into European medicine. Perhaps no other drug has ever been so widely and deservedly used as this American remedy for fevers, agues, and debility. The earliest authenticated account of the use of Cinchona bark in medicine is found in 1638, when the Countess of Cinchon, the wife of the Governor of Peru, was cured of fever by its administration. The Jesuit missionaries are said to have sent accounts of its virtues to Europe, in consequence of one of their brethren having been cured of fever by taking it at the suggestion of a South American Indian.

¹ *Philosophical Transactions*, May 7th, 1666.

The University of Montpellier, at the time of our great Civil War, was much derided by the Paris Faculty for its laxity in granting degrees in medicine. The enemies of Montpellier said that a three-months' residence, and the keeping of an act and opponency, sufficed to make a man a Bachelor of Medicine. The professors were accused of neglecting their lectures and selling their degrees; but, worse than all, it was alleged that blood-letting and purging had fallen into disuse, and that the Montpellier treatment was "more expectant than heroic, and more tonic than evacuant."¹ Friendly historians, on the other hand, say that at this period the medicinal uses of calomel and antimony were better taught there than elsewhere; that museums, libraries, and good clinical teaching flourished, so as to afford the student excellent means of acquiring a sound knowledge of his profession.²

WILLIAM HARVEY, M.D., the famous discoverer of the circulation of the blood, and the greatest physiologist the world has ever seen, was born at Folkestone, 1578. He entered Caius College, Cambridge, 1593. Having taken his degree, he travelled through France and Germany, and then visited Padua, the most celebrated school of medicine of that time. Fabricius ab Aquapendente was then professor of anatomy, Minadous professor of medicine, and Casserius professor of surgery. In 1615 Harvey was appointed Lumleian lecturer, and he commenced his course of lectures in the following year—the year of Shakespeare's death.

In this course he is supposed to have expounded his views on the circulation of the blood, which rendered his name immortal. His celebrated work, *Exercitatio Anatomica de Motu Cordis et Sanguinis*, was published in 1628; but he says in that work that for more than nine years he had confirmed and illustrated his opinion in his lectures, by arguments which were founded on ocular demonstration. He was appointed physician extraordinary to James I. in 1618. He was in attendance on King Charles I. at the battle of Edgehill. The king had been an enlightened patron of Harvey's researches, and had placed the royal deer parks at Hampton Court and Windsor at his disposal. In 1651 Harvey's *Exercitationes de Generatione* was published.

ARISTOTLE knew but little of the vessels of the body, yet he traced the origin of all the veins to the heart, and he seems to have been aware of the distinction between veins and arteries. "Every artery," he says, "is accompanied by a vein; the former are filled only with breath or air."³

Aristotle thought that the windpipe conveys air into the heart. Al-

¹ Dr. Latham's *Life of Sydenham*.

² *Ibid.*

³ *De Spiritu*, v. 1078. There is some doubt as to the genuineness of this work.

though GALEN understood the muscles very well, he knew little of the vessels. The liver he held to be the origin of the veins, and the heart of the arteries. He knew, however, of their junctions or anastomoses.¹

MONDINO, the anatomist of Bologna, who dissected and taught in 1315, had some idea of the circulation of the blood, for he says that the heart transmits blood to the lungs.² The great Italian anatomists diligent students as they were of the human frame, all missed the great discovery. SERVETUS, who was burnt by Calvin as a heretic in Geneva in 1553, is the first person who distinctly describes the small circulation, or that which carries the blood from the heart to the lungs and back again to the heart. He says: ³ "The communication between the right and left ventricles of the heart is made, not as is commonly believed, through the partition of the heart, but by a remarkable artifice the blood is carried from the right ventricle by a long circuit through the lungs; is elaborated by the lungs, made yellow, and transferred from the *vena arteriosa* into the *arteria venosa*." Still, his theories are full of fancies about a "*vital spirit*, which has its origin in the left ventricle," and are accordingly unscientific to that extent. Servetus was, however, certainly the true predecessor of Harvey in physiology; this is universally admitted.⁴

REALDUS COLUMBUS⁵ is thought by some writers to have had a still greater share than Servetus in the discovery of the circulation. He denies the muscularity of the heart, yet correctly teaches that the blood passes from the right to the left ventricle, not through the partition in the heart but through the lungs. Harvey quotes Columbus, but does not refer to Servetus. It must be remembered that when the unfortunate Servetus was burnt at the stake, his work was destroyed with him, and only two copies are known to have escaped the flames.⁶

The discovery of the valves of the veins by SYLVIVS and FABRICIVS⁷ undoubtedly was the chief factor in the preparation for Harvey's discovery of the circulation. It was he who first appreciated their significance, and grasped the full meaning of the pulmonary circulation. CÆSALPINUS, in his *Questiones Peripatetica* (1571), is another claimant for the honours due to Harvey; he had certain confused ideas of the general circulation, and he made some experiments which enabled him to understand the pulmonary circulation, but he certainly did not

¹ Whewell, *Hist. Induct. Sciences*, vol. iii. p. 394.

² *Ibid.*

³ *Christianismi Restitutio* (1553).

⁴ *Ency. Brit.*, art. "Harvey."

⁵ *De Re Anatomica* (1559).

⁶ Whewell, *loc. cit.*

⁷ Sylvius discovered their existence; but Fabricius remarked that they were all turned towards the heart.

know the circulation of the blood as a whole ; he knew no more of it, in fact, than he gathered from Galen and Servetus.¹

Even Harvey, splendid as was the work he did, could not entirely demonstrate the complete circulation of the blood. He was not able to discover the capillary vessels by which the blood passes from the arteries to the veins. This, the only missing point, was reserved for MALPIGHI to discover. In 1661 this celebrated anatomist saw in the lungs of a frog, by the aid of the newly invented microscope, the blood passing from one set of vessels to the other.

Harvey began his investigations by dissecting a great number of living animals. He examined in this way dogs, pigs, serpents, frogs, and fishes. He did not disdain to learn even from slugs, oysters, lobsters, and insects, and the chick itself while still in the shell. He observed and experimented upon the ventricles, the auricles, the arteries, and the veins. He learned precisely the object of the valves of the veins—to favour the flow of the blood towards the heart ; and it was to this latter observation, and not the vivisection, that he attributed his splendid discovery.

“I remember,” says Boyle, “that when I asked our famous Harvey what were the things that induced him to think of a circulation of the blood, he answered me, that when he took notice that the valves in the veins of so many parts of the body were so placed, that they gave a free passage to the blood towards the heart, but opposed the passage of the venal blood the contrary way, he was incited to imagine that so provident a cause as Nature had not placed so many valves without design ; and no design seemed more probable than that the blood should be sent through the arteries, and return through the veins, whose valves did not oppose its cause that way.” What clear views of the motions and pressure of a fluid circulating in ramifying tubes must have been held by Harvey to enable him to deduce his discovery from a contemplation of the simple valves ! It was observation, experience, which led him to this. “In every science,” he says,² “be it what it will, a diligent observation is requisite, and sense itself must be frequently consulted. We must not rely upon other men’s experience, but our own, without which no man is a proper disciple of any part of natural knowledge.”

Dr. J. H. Bridges, of the Local Government Board, delivered the Harveian oration on October 20th, 1892, at the Royal College of Physicians. Dr. Bridges said : “In his discovery William Harvey employed every method of biological research, direct observation,

¹ *Ency. Brit.*, art. “Harvey.”

² *Generation of Animals.*

experiment, above all the great Aristotelian method of comparison to which he himself attributes his success. His manuscript notes show how freely he used it. They show that he had dissected no less than eighty species of animals. It is sometimes said that experimentation on living animals was the principal process of discovery. This I believe to be an exaggerated view, though such experiments were effective in convincing others of the discovery when made. It need not be said that no ethical problem connected with this matter was recognised in Harvey's time. The first to recognise such a problem was that great and successful experimenter, deep thinker, and humane man, Sir Charles Bell. What were the effects of Harvey's discovery? It was assuredly the most momentous event in medical history since the time of Galen. It was the first attempt to show that the processes of the human body followed or accompanied each other by laws as certain and precise as those which Kepler and Galileo were revealing in the solar system or on the earth's surface. Henceforth it became clear that all laws of force and energy that operated in the inorganic world were applicable to the human body."

The case for Harvey's originality is well put by the author of the article on Harvey in the *Dictionary of National Biography*. "The modern controversy as to whether the discovery was taken from some previous author is sufficiently refuted by the opinion of the opponents of his views in his own time, who agreed in denouncing the doctrine as new; by the laborious method of gradual demonstration obvious in his book and lectures; and lastly, by the complete absence of lucid demonstration of the action of the heart and course of the blood in Cæsalpinus, Servetus, and all others who have been suggested as possible originals of the discovery. It remains to this day the greatest of the discoveries of physiology, and its whole honour belongs to Harvey."

"That there is one blood stream, common to both arteries and veins, that the blood poured into the right auricle passes into the right ventricle, that it is from there forced by the contraction of the ventricular walls along the pulmonary artery through the lungs and pulmonary veins to the left auricle, that it then passes into the left ventricle to be distributed through the aorta to every part of the animal body; and that the heart is the great propeller of this perpetual motion, as in a circle. This is the great truth of the motion of the heart and blood, commonly called the circulation, and must for ever remain the glorious legacy of William Harvey to rational physiology and medicine in every land."¹

¹ Harvey, *On the Circulation*. Dr. Bowie's edit.

Harvey explains how he was led to his great discovery: "When I first gave my mind to vivisections as a means of discovering the motions and uses of the heart, and sought to discover these from actual inspection, and not from the writings of others, I found the task so truly arduous, so full of difficulties, that I was almost tempted to think with Frascatorius, that the motion of the heart was only to be comprehended by God. For I could neither rightly perceive at first when the systole and when the diastole took place, nor when and where dilatation and contraction occurred, by reason of the rapidity of the motion, which in many animals is accomplished in the twinkling of an eye, coming and going like a flash of lightning; so that the systole presented itself to me now from this point, now from that; the diastole the same; and then everything was reversed, the motions occurring, as it seemed, variously and confusedly together. My mind was therefore greatly unsettled, nor did I know what I should myself conclude, nor what believe from others. I was not surprised that Andreas Laurentius should have written that the motion of the heart was as perplexing as the flux and reflux of Euripus had appeared to Aristotle. At length, and by using greater diligence and investigation, making frequent inspection of many and various animals, and collating numerous observations, I thought that I had attained to the truth, that I should extricate myself and escape from this labyrinth, and that I had discovered what I so much desired, both the motion and the use of the heart and arteries." ¹

JOHN LOCKE (1632-1704). The great philosopher was a thoroughly educated physician engaged in the practice of medicine. He was the friend of Sydenham, whose principles he defended and whose works are doubtless permeated with the thoughts of the author of the famous treatise on the Human Understanding. In a letter of Locke's to W. Molyneux he says: "You cannot imagine how far a little observation carefully made by a man not tied up to the four humours [Galen], or sal, sulphur, and mercury [Paracelsus], or to acid and alkali [Sylvius and Willis], which has of late prevailed, will carry a man in the curing of diseases, though very stubborn and dangerous; and that with very little and common things, and almost no medicine at all." Locke declared that we have no innate ideas, but that all our knowledge is derived from experience. The acquirement of knowledge is due to the investigation of things by the bodily senses.

Surgery about this period began to flourish in England. RICHARD

¹ Harvey, *On the Circulation of the Blood*. Bohn's edit., revised by Dr. Bowie, 1889.

WISEMAN (1625-1686), the "Father of English Surgery," was in the royal service from Charles I. to James II. His military experience greatly assisted him in his profession. He treated aneurism by compression, practised "flap-amputation," and laid down rules for operating for hernia.

JAMES PRIMROSE, M.D. (died 1659), was a voluminous writer who opposed the teaching of Harvey on the circulation of the blood.

BALDWIN HAMEY, jun., M.D., was the most munificent of all the benefactors of the London College of Physicians. He was lecturer on Anatomy at the College in 1647, and a voluminous writer, though he published little or nothing.

FRANCIS GLISSON, M.D. (died 1677), was one of the first of the group of anatomists in England who, incited by Harvey's example, devoted themselves to enthusiastic research. His account of the cellular envelope of the portal vein in his work *De Hepate*, published in 1654, has immortalised his name in the designation "Glisson's capsule." He wrote a work on rickets, *De Rachitide seu Morbo Puerili*. Glisson ascribed to the lymphatic vessels the function of absorption.

JONATHAN GODDARD, M.D. (died 1674), frequented the meetings which gave birth to the Royal Society. He was a good chemist, and invented the famous volatile drops known on the Continent as the Guttæ Anglicanæ. He made the first telescope ever constructed in this country.

DANIEL WHISTLER, M.D. (died 1684), wrote an essay on "The Rickets," which is the earliest printed account we have of that disease.

THOMAS WHARTON, M.D. (died 1673), was a very distinguished anatomist, who remained in London during the whole of the plague of 1666. He was the author of the most accurate work on the glands of the body and their diseases which up to that time had appeared.

RAYMOND VIEUSSSENS in 1684 published a great work on the anatomy of the brain, spinal cord, and nerves. He investigated the sympathetic nerve and the structure of the heart.

LEEUEWENHOECK (1632-1723) discovered the corpuscles in the blood and the spermatozoa.

MARCELLO MALPIGHI (1628-1694), by his microscopical researches, first explained the organization of the lung and the terminations of the bronchial tubes. He traced the termination of the arteries in the veins, and thus completed the discovery of the circulation of the blood; by his researches in the deeper layer of the cuticle, and certain bodies in the spleen and kidney, he has given his name to these structures.

The invention of the MICROSCOPE in 1621 was of the utmost importance to the study of minute anatomy and physiology.

PIERRE DIONIS (died 1718), a famous French surgeon, published a work on the anatomy of man, which was translated into Chinese at the emperor's request. He also wrote on rickets in relation to the pelvis, and advanced the study of dentistry. He explained the circulation, and wrote a monograph on catalepsy.

THOMAS BARTHOLIN (1619-1680), professor of anatomy at Copenhagen, made important investigations on the lacteals and lymphatic vessels.

CASPAR ASSELLIUS (1581-1626) discovered the chyloferous vessels in the dog; FABRICE DE PEIRESC (1580-1637), dissecting a criminal two hours after execution, discovered them in man; VAN HORNE (1621-1670), in 1652, first demonstrated the vessels in man. (It has, however, been claimed that George Jolyffe discovered the lymphatics in 1650.)

JEAN PECQUET (1622-1674), a French physician, published, in 1651, his *New Anatomical Experiments*, in which he made known his discovery of the receptacle of the chyle, till then unknown, and described the vessel which conveys the chyle to the subclavian vein.

OLAUS RUDBECK (1630-1702), a Swedish surgeon, shares with Jolyffe the honour of the discovery of the termination of the lymphatic vessels. He demonstrated them in the presence of Queen Christina, and traced them to the thoracic duct, and the latter to the subclavian vein.

GERARD BLAES (died 1662) made numerous discoveries in connection with the glands.

ANTONY NUCK (1650-1692) first injected the lymphatics with quick-silver, rectified various errors in the work of his predecessors, and by his own researches did much to complete the anatomy of the glands.

PAUL SARPJ (1552-1623), of Venice, was a monk of whom La Courayer said, "Qu'il était Catholique en gros et quelque fois Protestant en détail." He was the friend of Galileo, and, though he did not invent the telescope, was the first who made an accurate map of the moon. It is not true that he anticipated Harvey in his discovery of the circulation, though he was a great physiologist, and discovered the contractility of the iris.

NATHANAEL HIGHMORE (1613-1685) was a physician and anatomist who is chiefly remembered for his description of the cavity in the superior maxillary bone which bears his name. It had, however, been previously described by Cassorius. He demonstrated the difference between the lacteals and the mesenteric veins.

GEORGE WIRSUNG (died 1643) was a prosector to Vesalius. He discovered the excretory duct of the pancreas.

SIR CHRISTOPHER WREN (1632-1723) was the first to suggest the injection of medicines into the veins.

THORBERN, a Danish peasant, about this time invented an instrument for amputating the elongated uvula.

JAN SWAMMERDAM (1637-1686) was the first to prove that the queen bee was a female.

THOMAS MILLINGTON (*circa* 1676) pointed out the sexual organs of plants.

FELIX VICQ D'AZYR (1748-1794) was one of the zoologists whose researches exercised an important influence on the progress of anatomy. He investigated the origin of the brain and nerves, and the comparative anatomy of the vocal organs.

SIR THOMAS BROWNE, M.D., of Norwich (1605-1682), the author of the immortal *Religio Medici*, studied medicine at Montpellier, Padua, and Leyden. He was a man who, in his own words, *could not do nothing*. Though he wrote a famous work on *Vulgar Errors*, he could not rise superior to the commonest one of his time—the belief in witchcraft.

THOMAS WILLIS, M.D. (1621-1675), was celebrated for his researches in the anatomy and pathology of the brain. Unfortunately he neglected observation for theorising.

Dr. Freind said of Willis that he was the first inventor of the nervous system. Willis taught that the cerebrum is the seat of the intellectual faculties, and the source from which spring the voluntary motions. He consigned the involuntary motions to the cerebellum; these go on in a regular manner, without our knowledge and independently of our will. He supposed that the nerves of voluntary motions arise chiefly from the cerebrum, and those of the involuntary motions from the cerebellum or its appendages.¹

Willis deserves to be gratefully remembered in medical history as the great reformer of pharmacology. Having been led to consider how it is that medicines act on the various organs of the body, he reflected that there was usually very little relationship between the means of cure and the physiological and pathological processes to be influenced. Medicines were given at random. Mineral poisons, such as antimony, were recklessly prescribed, to the destruction, not of the disease only, but too frequently of the patient also. "So heedlessly," says Willis, "are these executioners in the habit of sporting with the human body, while

¹ Thomson's *Life of Cullen*, vol. i. p. 206. Willis, *Anatomy of the Brain*, chaps. xv.-xvii.

they are led to prepare and administer these dangerous medicines, not by any deliberation, nor by the guidance of any method, but by mere hazard and blind impulse."¹

The object of Willis was to establish a direct and reasonable relationship between the physiological and morbid conditions of the body on the one hand, and the indications for cure and the therapeutic means by which these were to be brought about on the other.² It was a great task, and Willis did not wholly succeed; but his method was the right one, however grievously he failed to carry it into practice, for he prescribed blood, the human skull, salt of vipers, water of snails and earthworms, millipeds, and other things which he ought to have known could have no effect on any disease.³ We must not be too severely critical, for Willis was the first to attempt the reformation of this degraded state of *Materia Medica*.

The state of *Materia Medica* (or the drugs and chemicals used by the physician) during the end of the seventeenth and the earlier part of the eighteenth century, was remarkable, says Dr. Thomson,⁴ for four circumstances.

First, there was a great number of remedies strongly recommended for the cure of diseases; but many of them were inert and useless, and thus the practitioner was perplexed and confused.

Secondly, the popular confidence in all these medicines was irrational and extreme.

Thirdly, it was the custom to combine in one prescription a great number of ingredients. The *Pharmacopœias* of the period contain formulæ which embraced in some instances from twenty-four up to as many as fifty-two ingredients. Sydenham is the first who exhibits any tendency to greater simplicity in his prescriptions.

Lastly, there was no rational or logical connection between the disease to be cured and the remedy with which it was treated. Empiricism and superstition to a serious extent dominated medicine, and retarded its progress.

Yet, even during the seventeenth century, original thinkers and men of genius connected with one or other of the universities, struck out a path for themselves which led to brighter things. First was Harvey, then came Wharton, Glisson, Willis, Lower, Mayow, Grew, Charleton, Collins, Sydenham, Morton, Bennet, and Ridley; all these men were students of anatomy and ardent investigators in the field of physiology. It is true that it was long before the labours of these pioneers of sci-

¹ *Pharmaceutike Rationalis*, London, 1675. Præfatio.

² Thomson's *Life of Cullen*, vol. ii. p. 546.

³ *Ibid.*, p. 547.

⁴ *Life of Cullen*, vol. ii. p. 536.

tific medicine resulted in any marked improvement in the actual method of treating disease; it is no less certain that our methods of to-day are based upon the labours of the great scientific investigators of the age we are considering.

SAMUEL COLLINS, M.D. (died 1710), was celebrated as an accomplished comparative anatomist, whose work was much praised by Boerhaave and Haller.

WILLIAM CROONE, M.D. (died 1684), was one of the original Fellows of the Royal Society. In 1670 he was appointed lecturer on anatomy at Surgeons' Hall. He is gratefully remembered as the founder of what is now called the "Croonian Lecture."

RICHARD LOWER, M.D. (1631-1691), was an anatomist and physiologist, who assisted Willis in his researches, and who wrote a treatise on transfusion of blood, which he practised at Oxford in 1665, and also before the Royal Society. His name is kept in remembrance by anatomists by its association with the study of the heart in the structure known as the "tuberculum Lowerii."

We must not omit to mention FRÈRE JACQUES, who went to Paris in 1697; he was a Franciscan monk, who was a famous operator for the stone. Originally a day labourer, he became so expert a lithotomist that he is said to have cut nearly 5,000 persons in the course of his life. In the height of his success he had no knowledge of anatomy, though he was afterwards induced to learn it. He is for ever celebrated as the inventor of the lateral method in lithotomy.¹

¹ Cooper's *Surgical Dictionary*, p. 773.

CHAPTER III.

SKATOLOGICAL MEDICINE AND THE REFORM OF PHARMACOLOGY.

Loathsome Medicines.—Sympathetical Cures.—Weapon-Salve.—Superstitions.

NOTWITHSTANDING all the splendid scientific work of the period, the absurdest superstitions about amulets and charms still held their ground. Sir John Harrington, in his *Schoole of Salerne*, printed in 1624, says: "Alwaies in your hands use eyther Corall or yellow Amber, or a chalcedonium, or a sweet Pommander, or some like precious stone to be worne in a ring upon the little finger of the left hand; have in your rings eyther a Smaragd, a Saphire, or a Draconites, which you shall beare for an ornament; for in stones, as also in hearbes, there is great efficacie and vertue, but they are not altogether perceived by us; hold sometime in your mouth eyther a Hyacinth, or a Crystall, or a Granat, or pure Gold, or Silver, or else sometimes pure Sugar-candy. For *Aristotle* doth affirme, and so doth *Albertus Magnus*, that a Smaragd worne about the necke, is good against the Falling-sicknes; for surely the vertue of an hearbe is great, but much more the vertue of a precious stone, which is very likely that they are endued with occult and hidden vertues."

MATERIA MEDICA.

Amongst those who, after Willis, laboured to reform pharmacology may be mentioned—

JOHN ZWELFER, a learned physician of Vienna, who published in 1651 a greatly improved Pharmacopœia, which rejected many useless and improper medicines.

DANIEL LUDWIG in 1671 published a dissertation on useless and unsatisfactory drugs. He denied the virtues of earthworms, toads, and the like.

MOSES CHARAS (1618–1698) was a pharmacist of Paris, who founded the historical establishment known as the *Vipères d'or* of that city. Seventeenth-century pharmacy owed much to this man, who was "one of the last of the Arabian polypharmacists, one of the last of the adepts of expiring alchemy, and the immediate precursor of the epoch

of Lémery."¹ He studied pharmacy at Montpellier. He was acquainted with natural history.

No history of medicine would be complete without reference to the immense number of loathsome and filthy substances which from the remotest times, even up to the present, have been used as medicines. This subject has been treated in a very complete form by Captain Bourke in his work on *Skatological Rites of all Nations*, an important section of which is devoted to "Skatological Medicine."² The theory underlying the use of disgusting remedies seems to be this: Nearly all medicines which have any efficacy are unpleasant to take; a bitter infusion of tonic leaves or roots is not usually agreeable; many good medicines are very nasty, but their efficacy is universally acknowledged. Ignorant persons argue that the nastiness is the sign of the efficacy; that the more disgusting the potion or pill, the more good it will do. Even at the present day pauper and hospital patients of the lower classes have no faith in medicines which are not dark in colour and rich in sediment; elegant pharmacy would soon destroy the best East-End practice. The most repulsive sediment in a mixture is readily swallowed, and is usually considered highly "nourishing." Now from nasty herbal medicines to filthy animal excretions is but a short step. Pliny gives hundreds of instances of skatological remedies in his *Natural History*, and the ancient writers frequently prescribe them. They consist of such things as the dung and urine of various animals, not excepting those of man, of the catamenial and lochial discharges, of the sweat of athletes, of the parasites of human and animal bodies, of ear wax, human blood, etc.

"XENOCRATES OF APHRODISIAS (about A.D. 70) introduced disgusting filth as medicines; e.g., ear wax, catamenial fluid, human flesh, bats' blood, etc."³

"ASCLEPIADES PHARMACION (about A.D. 100) recommended even animal excrement as a medicine."⁴

QUINTUS SERENUS SAMONICUS (died A.D. 211) prescribed mouse dung in poultices; goats' urine internally for stone in the bladder; earth and dung from a wagon rut for colic, externally.⁵

MARCELLUS EMPIRICUS, physician to Theodosius (345-395), prescribed natural pills of rabbit's dung. Dr. Baas declares that this remedy is in use on the Rhine at the present day, as a cure for consumption.⁶

¹ Cap. *Études Biographiques*, Ser. i. p. 120.

² See *British Medical Journal*, June 11, 1892, p. 1263.

³ Baas' *Hist. Med.*, p. 159.

⁴ *Ibid.*

⁵ *Ibid.*, p. 184.

⁶ *Ibid.*, p. 187.

Culpeper, in his translation of the *Pharmacopœia* (1653), ridicules the remedies enumerated in that work. Thus the College of Physicians employ "the fat, grease, or suet of a duck, goose, eel, bore, heron, thymallos (*'if you know where to get it,'* says Culpeper), dog, capon, beaver, wild cat, stork, hedgehog, hen, man, lion, hare, kite, or jack (*if they have any fat, I am persuaded 'tis worth twelve pence the grain*), wolf, mouse of the mountains (*if you can catch them*), pardal, hog, serpent, badger, bear, fox, vulture (*if you can catch them*), album græcum, east and west benzoar, stone taken out a man's bladder, viper's flesh, the brain of hares and sparrows, the rennet of a lamb, kid, hare, and a calf and a horse too (*quothe the colledg*) [*they should have put the rennet of an ass to make medicine for their addle brains*], the excrement of a goose, of a dog, of a goat, of pigeons, of a stone horse, of swallows, of men, of women, of mice, of peacocks," etc., etc.

There was, says Southey,¹ a water of man's blood which in Queen Elizabeth's day was a new invention, "whereof some princes had very great estimation, and used it for to remain thereby in their force, and, as they thought, to live long." They chose a strong young man of twenty-five, dieted him for a month on the best meats, wines and spices, and at the month's end they bled him in both arms as much as he could "tolerate and abide." They added a handful of salt to six pounds of this blood, and distilled it seven times, pouring water upon the residuum after every distillation. An ounce of this was to be taken three or four times a year. As the life was thought to be in the blood, it was believed it could thus be transferred.

Dr. O. Möller says that in Denmark, even now in some few places, human excrements are not entirely obsolete as epispastic applications in inflammation of the breast.²

Dr. Baas says³ that urine is taken in the Rhine provinces in fevers instead of quinine. This was recommended by the surgical writer Schmidt in 1649. In the seventeenth century the old pharmacies of Germany contained, amongst other disgusting remedies, frog-spawn water, mole's blood, oil of spiders, snake's tongue, mouse dung, spirits of human brain, urine of a new-born child, etc.⁴ The dung of screech-owls was prescribed for melancholy, as also was the dung of doves and calves boiled in wine, ox-dung, etc. Dog-dung and fleas boiled with sage was a medicine for gout, and death-sweat was used as a cure for warts.⁵

Mould from the churchyard is used in some parts of Ireland and in

¹ *The Doctor*, p. 39.

² *Hist. Med.*, p. 517.

³ *Denmark, Hygiene and Demography*, p. 57.

⁴ *Ibid.*, p. 545.

⁵ *Ibid.*, p. 547.

Shetland medicinally. Clay or mould from a priest's grave boiled with milk is given as a decoction for the cure of disease.¹ The dew collected from the grave of the last man buried in a churchyard has been used as a lotion for goitre. It is so employed at Launceston.² In Shetland a stitch in the side was treated by applying mould dug from a grave and heated, the mould was to be taken from and returned to the grave before sunset.³ In Lincolnshire a portion of a human skull taken from the grave was grated and given to epileptics for the cure of fits. A similar custom prevailed in Kirkwall, at Caithness, and the Western islands—the patient was made to drink from a suicide's skull.⁴

In the year 1852 I saw amongst the more precious drugs in the shop of a pharmaceutical chemist at Leamington a bottle labelled in the ordinary way with the words, "Moss from a Dead-Man's Skull." This has long been used superstitiously, dried, powdered, and taken as snuff, for headache and bleeding at the nose.⁵

SYMPATHETICAL CURES.

A curious chapter in the history of surgery is found in the popular belief in "sympathetical cures," which prevailed in the reigns of James I. and Charles I. Sir Kenelm Digby professed to have introduced a method of curing wounds by the "powder of sympathy." Dr. Pettigrew, in his *Superstitions of Medicine and Surgery*, says that a Mr. James Howel, endeavouring to part some friends who were fighting a duel, received a severe wound in his hand. The king sent one of his own surgeons to attend him; but as the wound did not make good progress, application was made to Sir Kenelm Digby, who first inquired if the patient had any article which had the blood upon it. Mr. Howel sent for the garter with which his hand had been bound; then a basin of water having been brought, Sir Kenelm dissolved therein some powder of vitriol, and immersed the bloody garter in the solution. The patient was instructed to lay aside all his plasters and keep the wound clean and in a moderate temperature. All the while the garter lay in the solution of vitriol. The patient did well; probably if it had been applied to the injured part it would have made it worse. In the course of five or six days the wound was cicatrized and a cure effected. Sir Kenelm professed to have learned the secret from a Carmelite friar.

¹ Gomme, *Ethnology in Folklore*, p. 114. ² Dyer, *English Folklore*, p. 150.

³ Rogers, *Social Life in Scotland*, iii. 226.

⁴ Gomme, *Ethnology in Folklore*, pp. 114, 115. Dyer, *English Folklore*, p. 147. Rogers, *Social Life in Scotland*, iii. 225.

⁵ Boyle, *Porosness of Animal Bodies*. Works, vol. iv. p. 767. Floyer, *Touchstone of Medicines*, vol. i. p. 154.

It was communicated to the king's physician, Dr. Mayerne, and before long every country barber knew of it. Sir Kenelm Digby discoursed on the matter before an assembly of nobles and learned men at Montpellier in France, and endeavoured to explain the action of his powder by all sorts of conjectures, as emanation of light, the action of impinging rays, etc. He tried to prove that the spirit which emanated from the vitriol became incorporated with the blood, and there met the exhalation of hot spirits from the inflamed part.

Infinitely simpler, however, was the process of cure. Nature, left to herself, did the whole of the work. It seemed, as Dr. Pettigrew says, that it had hitherto been the practice of surgeons to place every obstacle in the way of the union of severed parts of the body. What with ointments and various more or less filthy applications, the edges of the wound were kept apart, and so the healing process was retarded.

Of a kindred character to the "powder of sympathy" was the "weapon salve" of the period. Instead of anointing the wound, the knife, axe, or other instrument which caused it was smeared with ointment and the weapon was then carefully wrapped up and put away. Dryden refers to this same "weapon salve" in the "Tempest," Act V. sc. 1. Dr. Pettigrew says that the practice was at one time very general.¹

The principle underlying the doctrine of sympathetic powders was explained by Sir Kenelm thus: "In time of common contagion they use to carry about them the powder of a toad, and sometimes a living toad or spider shut up in a box; or else they carry arsenic, or some other venomous substance, which draws unto it the contagious air, which otherwise would infect the party; and the same powder of toad draws unto it the poison of a pestilential cold. The scurf or farcy is a venomous and contagious humour within the body of a horse; hang a toad about the neck of the horse in a little bag, and he will be cured infallibly; the toad, which is the stronger poison, drawing to it the venom which was within the horse."²

The same author says that persons of ill breath can be cured by holding their mouths open at a cesspool, the greater stink having the power to draw away the less.³

In the reign of Charles II. a gentleman named Valentine Greatrakes, of a good family and education, "felt an impulse that the gift of curing the king's evil was bestowed upon him." He published an account of his cures of this and other diseases, ague, epilepsy, and palsy, and some

¹ *Medical Superstitions*, p. 161.

² Sir K. Digby, *Powder of Sympathy*, p. 97.

³ *Ibid.*, p. 76.

other complaints more or less connected with the nervous system, in a letter to the Hon. Robert Boyle. He seems to have performed his curès, which were by some persons considered miraculous, by a kind of massage, or "by the Stroaking of the Hands." The cures were simply the effect of an excited imagination.¹

¹ Pettigrew's *Medical Superstitions*, p. 155.

CHAPTER IV.

BATHS AND MINERAL WATERS.

Miraculous Springs.—The Pool of Bethesda.—Herb-baths.

ESPECIALLY in Germany mineral waters achieved great popularity in the treatment of diseases in the seventeenth century.

In ancient times, according to Pliny, Paulus Ægineta, and others, mineral waters were recognised as possessing curative effects, and the temples of health were frequently erected in contiguity to these powerful aids to treatment. Savages are everywhere fully aware of the value of such medicinal waters, and avail themselves of their benefits. Hot springs, wherever they occur, are highly esteemed by the natives. Humboldt states that on Christianity being introduced into Iceland, the natives refused to be baptized in any but the waters of the geysers.¹ Hooker tells us that in the hot springs of Yeuntong, which burst from the bank of the Lachen, in the Himalayas, the natives remain three days at a time, bathing in the saline and slightly sulphuretted waters. No better treatment for certain forms of skin diseases could be followed.² Such a course of treatment is carried out now at the baths of Leuk, in Switzerland, amongst other places. There the patients take their meals and play cards, chess, draughts, etc., while up to their necks in the warm medicinal waters. Hooker tells us, again, of the use of hot baths amongst the Sikkim Bhoteas. The bath consists of a hollowed prostrate tree trunk, the water of which is heated by throwing in hot stones with bamboo tongs. They can raise the temperature to 114°, the patient submitting to this at intervals for several days, never leaving till wholly exhausted.³

Dr. Mead⁴ thinks that the Pool of Bethesda, spoken of in the Gospel of St. John, chap. v., was a medicinal bath, whose virtues principally resided in the mud which settled at the bottom. It was necessary, therefore, that the pool should be "troubled," that is to say, stirred up, so that the person bathing therein might derive benefit from the

¹ *Pers. Narr.*, iv. 195.

² *Ibid.*, p. 214.

³ *Himalayan Journals*, ed. 1891, p. 371.

⁴ *Medica Sacra*, p. 62.

metallic salts, "perhaps from sulphur, alum, or nitre," which settled at the bottom. Celsus and Pliny recommend medicinal baths for nervous disorders. Pliny particularly advises aluminous baths for paralytics, and adds that "They use the mud of those fountains with advantage, especially if, when it is rubbed on, it be suffered to dry in the sun."¹

Many curious instances of the superstitious uses made of holy wells in the treatment of disease, in which customs the elements of magic ritual are not difficult to discover, are given in Gomme's *Ethnology in Folklore*, pp. 97-99.

Eight miles from Munich lies the village of Heilbrunn (healing spring); tradition says it is the oldest medicinal spring in Bavaria. Near the spring was a monastery, said to have been destroyed and the well choked with the *débris* in 935 A.D. In 1509 the monks made some excavations, and the source of the spring was discovered; at the same time flames burst forth over it, the phenomena being of course attributed to a miracle. The reputation of the medicinal waters brought the Elector's wife to the spot in 1659; she derived such benefit from the visit that the spring was named after the princess—Adelheid's Quelle. It became famous amongst the country people for the cure of scrofulous and other diseases. In 1825 Dr. A. Vogel, of Munich, analysed the waters, and found them to contain iodine in important quantity. This led to the deepening and improvement of the spring, and in the course of the operations one of the workmen brought a lighted candle close to the surface of the water; the gas, escaping in bubbles, at once caught fire, and the miracle of 1509 was explained. The fact is that a considerable amount of carburetted hydrogen floats over the surface of the water, and will readily take fire when in contact with a light. Recent analysis of the water shows that it contains bromine, iodine, and chloride of sodium, sulphate of soda, carbonates of soda, lime, magnesia, and iron. It is altogether one of the most remarkable of the medicinal springs, and its composition explains its value in calming and soothing the mucous membrane of the stomach and other organs. Its curative effects have been proved in scrofula, glandular swellings, bronchial affections, mesenteric and female disorders.²

Baths impregnated with vegetable extracts and odours have long been in use. Pine-leaves are at present largely employed, and baths of conium, lavender, hyssop, etc., are still used as sedatives. Anciently baths of this kind were as complicated in character as the medicines administered internally.

¹ Pliny, *Nat. Hist.*, bk. xxxi. c. 32.

² *Pharmaceutical Journal*.

Here is an ancient prescription for a medicinal bath :—

THE MAKYNG OF A BATHE MEDICINABLE.¹

“ Holy hokke and yardehok peritory² and the broun fenelle,³
 Walle wort⁴ herbe John⁵ Sentory⁶ rybbewort⁷ and cammamelles,
 Hey hove⁸ heyriiff⁹ herbe benet¹⁰ brese wort¹¹ and small ache,¹²
 Broke lempk¹³ Scabiose¹⁴ Bilgres wild flax is good for ache ;
 Wethy leves, grene otes boyld in fere fulle soft,
 Cast them hote in to a vesselle and sett your soverayn alloft,
 And suffire that hete a while as hoot as he may a-bide ;
 Se that place be couered welle over and close on every side ;
 And what dissesse ye be vexed with, grevaunce outhir peyn,
 This medicync shalle make yow hoole surely, as men seyn.”¹⁵

George Herbert, in his *Priest to the Temple*, enumerates the duties of the parson's wife, and extols the virtues of these homely remedies. “For salves, his wife seeks not the city, but prefers her gardens and fields before all out-landish gums ; and surely hyssop, valerian, mercury, adder's tongue, melilot, and St. John's wort, made into a salve, and elder, comphrey, and smallage, made into a poultice, have done great and rare cures.”

¹ John Russell's *Boke of Nurture*, 991-1000.

² Pellitory of the wall, which abounds in nitrate of potass.

³ Probably *Peucedanum officinale*.

⁴ Danewort.

⁵ St. John's wort.

⁶ Centaury.

⁷ Plantain.

⁸ *Glechoma hederacea*.

⁹ *Galium Aparine*, prescribed in *Leechdoms*, v. 2, p. 345, for a “salve against the elfin race and nocturnal [goblin] visitors, and for the woman with whom the devil hath carnal commerce.”

¹⁰ Avens.

¹¹ Bruise wort, pimperl, or perhaps for Hembrisswort, daisy.

¹² Smallage, or wild-water parsley.

¹³ Brooklime.

¹⁴ Scabious.

¹⁵ John Russell's *Boke of Nurture*, Harl. MS. 4011, Fol. 171. The notes are from Dr. Furnivall's edition.

CHAPTER V.

WITCHCRAFT AND MEDICINE.

Comparative Witchcraft.—Laws against Sorcery.—Magic in Virgil and Horace.—Demonology.—Images of Wax and Clay.—Transference of Disease.—Witchcraft in the Koran.—White Magic and Black.—Coral and the Evil Eye.—“Overlooking” People.—Exorcism in the Catholic Church.

COMPARATIVE WITCHCRAFT.

“WITCHES and impostors,” said Bacon, “have always held a competition with physicians.” The History of Medicine, therefore, demands some notice of the strange delusions which have exerted the most terrible influence over the minds of men in all ages and in all stages of civilization. Nothing in the history of the human species is older than the belief in magic, and it will be found that the practices of the savage in this connection have their analogies amongst ourselves at the present day. Gipsy craft, fortune telling, dream interpretation, spiritualism, the miracles of the theosophists, may all be traced in the customs and practices of savage tribes. They are survivals which will not be got rid of probably for centuries to come. Education, so far from delivering us from the bondage, has curiously enough in many cases served but to rivet the chains more firmly. In the chapters on the demon theory of disease, much light has been thrown on the origin of our belief in the influence of spirits good and bad. Trials in England connected with witchcraft were most numerous in the seventeenth century. The most interesting is that of the Suffolk witches, when Sir Matthew Hale was the judge and Sir Thomas Browne the medical expert witness. This excellent and learned physician testified that certain children, said to have been bewitched, suffered from fits, heightened to great excess by the subtlety of the devil co-operating with the witches. The report alleges that after conviction of the accused the children immediately recovered.

While condemning the cruelty and severity of the laws against witchcraft, and reflecting on the injustice and ignorance with which they were enforced, we must remember that in many cases sorcerers and other dabblers in black magic have added to their supposed supernatural methods the very real and serious arts of the poisoner, and the not less

real, though purely mental influences of terror and alarm. To know that an evil-minded person was compassing one's death or was busied in bringing about, by diabolical influences, some dreadful sickness or other injury to one's person, was quite sufficient, in ignorant and superstitious times, to effect all the evil which it was in the mind of the magician or witch to induce. But probably there never was a regular professional sorcerer who did not use the actual weapons of poison, or deleterious drugs of some kind or other, to assist his evil intentions. In the case of the trial of the Countess of Somerset, in 1616, a charge of witchcraft was joined with the charge of poisoning Sir Thomas Overbury.¹ Witchcraft and murder were combined in the Master of Orkney's case. The last case ever brought before the "Chambre Ardente" in France resulted in the condemnation, in 1680, of a woman named Voisin, for sorcery and poisoning, in connection with the Marquise de Brinvilliers. But even apart from considerations of material injury, the mental impressions are often fatal enough; thus, in the Pacific Islands, to quote but one instance, magical arts have been proved effective through the patient's own imagination. "When he knows or fancies that he has been bewitched, he will fall ill, and he will actually die unless he can be persuaded that he has been cured. Thus, wherever sorcery is practised with the belief of its victims, some system of exorcism or some protective magical art becomes, not only necessary, but actually effective—a mental disease being met by a mental remedy to match it."² Hearne, when travelling in North America, was entreated by an Indian to give him a charm against an enemy (savages and primitive folk are great believers in white men as magicians). Hearne complied, and for fun, drew on a sheet of paper some circles, signs, and words. The Indian took care to let his victim know that he had "medicine" against him, and the poor wretch fell sick immediately, and shortly afterwards died. Cockayne quotes from Wier an account of a woman who wore an amulet to cure bad eyes, which were made worse by her constantly flowing tears. Some one who hated sorceries induced her to open and examine the charm. When unfolded, the paper showed nothing but these words: "May the devil scratch thine eyes out, and ——— in the holes." As soon as the woman saw how she had been deceived, she lost faith, took to crying again, and her eyes became as bad as ever.³

¹ *State Trials*, 951.

² Dr. E. B. Tylor, art. "Magic," *Ency. Brit.* See Ellis, *Polynesian Researches*; Turner, *Nineteen Years in Polynesia*; Polack, *Manners and Customs of New Zealanders*; Waitz, vols. v., vi.; all works mentioned by Dr. Tylor.

³ *Saxon Leechdoms*, vol. i. Pref., xxxii.

LAW AGAINST SORCERY.

At the accession of James I. of England, a law against witchcraft was passed, which continued in force for more than a century. We quote it in full (1 Jac. i. c. 12):—

“If any person or persons shall use, practise, or exercise any invocation or conjuration of any evil and wicked spirit, or shall consult, covenant with, entertain, employ, feed, or reward any evil and wicked spirit, to or for any intent or purpose, or take up any dead man, woman, or child out of his, her, or their grave, or any other place where the dead body resteth, or the skin, bone, or any part of any dead person, to be employed or used in any manner of witchcraft, sorcery, charm, or enchantment, or shall use, practise, or exercise any witchcraft, enchantment, charm, or sorcery, whereby any person shall be killed, destroyed, wasted, consumed, pined, or lamed in his or her body or any part thereof, every such offender is a felon without benefit of clergy.”

MAGIC AND MEDICINE.

Pliny says that the art of magic first originated in medicine, and that under the guise of promoting health it insinuated itself among mankind as a higher and more holy branch of the medical art. Then it added the religious element, and lastly incorporated with itself the astrological art, and so enthralled the senses of man by a three-fold bond.¹

MAGIC IN VIRGIL AND HORACE.

The sorceress of Virgil is a witch whose ancestry we shall have no difficulty in tracing anthropologically. We can discover her lineage from the parent witches of savage tribes, and we detect her offspring in the sorceress of our own times. She burns vervain and frankincense, chaunts a solemn lay, binds the victim's image with fillets of three colours, and in binding the knots makes the attendant say, “Thus do I bind the fillets of Venus.” One wax and one clay image are placed before the fire, and as the clay image hardens, so does the heart of Daphnis harden towards his new mistress; and as the wax softens, so is the heart of Daphnis made tender towards the sorceress. She buries the relics of what had belonged to Daphnis beneath her threshold; bruises poisonous plants from Pontus to enable him to transform himself into a wolf, and orders her attendant to cast the ashes of these herbs over her head into a running stream, at the same

¹ *Nat. Hist.*, Book xxx. chap. i.

time taking care not to glance behind her.¹ Horace also describes the concoction of a charm in a perfectly orthodox style whose family history is intelligible enough to the student of comparative sorcery. There is nothing in the classic witchcraft which does not exist to-day in the islands of savage peoples, and the methods of medicine-men in primitive forests.

IMAGES OF WAX, ETC., IN SORCERY.

A very widespread and ancient method of compassing a person's death by witchcraft is that of making a figure in wax, or other plastic material, to represent the victim of the incantation. The object seems to be the concentration of will-power to effect the wishes of the user of the charm. There is an innate belief that words are creative symbols; it may be derived from the perception of the power of man to effect that which he desires earnestly to effect, so that "whenever a good or evil wish," as Dr. Tylor says, "is uttered in words, it becomes a blessing or curse." This idea lies at the root of what is called "Christian science healing," *i.e.* healing by good wishes. In its evil form we have an ancient example in Ovid's sorceress:²—

King James, in his *Dæmonology*, says that "The devil teacheth how to make pictures of wax or clay, that by roasting thereof the persons that they bear the name of may be continually melted or dried away by continual sickness."

So the Governor-General of a Chinese province recently issued a proclamation, whereby it was declared unlawful to bring about the death of others by incantations. "You are forbidden," said Governor Wang, "if you have a grudge against any one, to practise the magic called 'Striking the Bull's Head,' that is to say, writing a man's name and age on a scrap of paper, and laying it before the bull-headed idol, and then buying an iron stamp and piercing small holes in this paper, and finally throwing it at the man on the sly, with the intention of compassing his death."³

"So recently," says the authoress of *Wanderings in China*, "as December, 1883, a case was tried at the Inverness police court, in which the cause of offence was the discovery of a clay image with pins stuck through it in order to compass the death of a neighbour, a dis-

¹ Goodwin, *Lives of the Necromancers*, pp. 127-132.

² *Heroid.*, vi. 91.

"Simulacraque cerea fingit,
Et miserum tenuis in jecur urget acus."

³ Gordon Cumming's *Wanderings in China*, vol. i. p. 336.

covery which resulted in an assault. Many similar cases have been discovered both in England and Scotland." ¹

"The demon-priests of Ceylon," says Gomme,² "make use of images of wax or wood, which represent the person to be injured. They drive nails into the points which represent the heart, the head, etc., mark the name of the intended victim on it, and bury it where he is likely to pass over it." Plato alludes to the same practice as obtaining amongst the Greeks of his period.³

There are very similar Scotch practices.

It was anciently believed that diseases could be transferred from one person to another. Says Pliny,⁴ "Take the parings of the toe-nails and finger-nails of a sick person and mix them up with wax, the party saying that he is seeking a remedy for a tertian, quartan, or quotidian fever, as the case may be; then stick this wax, before sunrise, upon the door of another person. Such is the prescription they give for these diseases."

Gomme says⁵ that St. Tegla's well, about half-way between Wrexham and Ruthin, is resorted to for the cure of epilepsy. The patient offers a cock, or if a woman, a hen. The bird is carried in a basket, first round the well, and then round the church. The patient enters the church, creeps under the altar, and remains there till morning. Having made an offering, he leaves the cock and departs. If the bird dies, it is supposed that the disease has been transferred to it, and the man or woman consequently cured.

The use of wax figures in enchantments is, as we have shown, very ancient, and it has lasted up to the present time. Simœtha in Theocritus says: "As I melt this wax by the help of the goddess, so may Myndian Delphis be presently wasted by love."⁶ And Horace refers to it:—

"Lanea et effigies evat, altera cerea."

(Lib. i., Sat. 8, l. 30.)

Paracelsus advises the patient afflicted with St. Vitus' dance to make an image of himself in wax or resin, and by an effort of mind to concentrate all his blasphemies and sins in it, "without the intervention of any other person, to set his whole mind and thoughts concerning these oaths on the image." Having done this, he was to destroy the image by fire.⁷

¹ Vol. i. p. 336. See also *In the Hebrides*, pp. 263-265. C. F. Gordon-Cumming.

² *Ethnology in Folklore*, p. 51.

³ *Nat. Hist.*, Book xxviii. ch. 24.

⁶ *Idyl* ii.

³ Plato, *Laws*, lib. xi.

⁵ *Ethnology in Folklore*, p. 87.

⁷ Hecker's *Epidemics*, p. 102.

Pliny says¹ that abrotonum (which was probably southernwood), "if put beneath the pillow, will act as an aphrodisiac, and that it is of the very greatest efficacy against all those charms and spells by which impotence is produced." As an antaphrodisiac he recommends the tamarisk, mixed in a drink or in food with the urine of an ox.²

Amongst the Tamils of Ceylon there is a ceremony performed with the skull of a child, with the design of producing the death of the person against whom the incantation is directed. Cabalistic figures are drawn upon the skull after it has been duly prepared. The name of the person to be destroyed by the charm is also written on the skull. Then a paste is composed with his saliva, some of his hair, and a little earth on which he has imprinted his footsteps, and this is spread upon a plate, and taken with the skull to the cemetery of the place, where for forty nights the evil spirits are invoked to destroy the denounced person. The natives believe that as the paste dries on the plate, the victim of the charm will waste and die.³

"Both Greeks and savages," says Mr. A. Lang,⁴ "have worshipped the ghosts of the dead. Both Greeks and savages assign to their gods the miraculous powers of transformation and magic, which savages also attribute to their conjurors or shamans. The mantle (if he had a mantle) of the medicine-man has fallen on the god; but Zeus, or Indra, was not once a real medicine-man."

In the Kalevala the hero of the poem wounds himself with an axe. The wound can only be healed by one who knows the mystic words that hold the secret of the birth of iron. Iron is the bane of warlike men; when the wizard curses the iron as a living thing, the hero is healed.⁵

KNOTS.

Justin Martyr says that the Jews used magic ties or knots in their exorcisms. The Babylonians did the same. When the god Marduk writes to soothe the last moments of a dying man, Hea says, "Take a woman's linen kerchief, bind it round thy right hand! loose it from the left hand, knot it with seven knots; do so twice."⁶

The 113th chapter of the Koran was written by Mohammed when he was suffering from an illness of a rheumatic character, and he believed that it was caused by some evil person who had bewitched him. The chapter runs thus:—

"Say, I fly for refuge unto the Lord of the daybreak, that he may deliver me from the mischief of those things which he hath created;

¹ Book xxi. 92.

² Book xxiv. 42.

³ Sir James Emerson Tennent's *Ceylon*, vol. ii. p. 545.

⁴ *Custom and Myth*, p. 200.

⁵ *Ibid.*, p. 169.

⁶ *Records of the Past*, vol. iii. p. 141.

and from the mischief of the night when it cometh on ; and from the mischief of woman blowing on knots ; and from the mischief of the envious, when he envieth." Sales' notes on this chapter explain the singular expression about knots ; he says : "That is, of witches, who used to tie knots in a cord, and to blow on them, uttering at the same time certain magical words over them, in order to debilitate the person they had a mind to injure." Wizards in the north who pretend to sell mariners a wind do something similar, and the French *Nouër l'aiguillete* is of the same character. This bewitchment by the knot was called by the Romans *Nodus* and *Obligamentum*. Mr. Cockayne says¹ the Saxons translated it into *lyb*, *drug*, *φάρμακον*. It was believed that a man might lose his power by being put under a knot, and there are cures for this injury in the *Leechbook*. We find protections "*contra maleficium ligaturæ ut vocant*." Priests are warned not to make any alterations in the mode of conducting the marriage service by any reason of these knots.²

Of course, as in all other kinds of witchcraft, actual poisons often had much to do with the magic.

WHITE MAGIC.

As there is White Magic, which according to popular belief is beneficent, and Black Magic, which is diabolical and hurtful, so there are white witches and black ones. The white can help, but not hurt. Cotta says :³ "The mention of witchcraft doth now occasion the remembrance in the next place of a sort of practitioners whom our custome and country doth call wise men and wise women, reputed a kind of good and harmless witches or wizards, who by good words, by hallowed herbes, and salves, and other superstitious ceremonies, promise to allay and calme divels, practices of other witches, and the forces of many diseases." The last lingering remains of such wise women may be found in the poorer quarters of all our great towns as well as in country places ; they sell herbs, and always have a special ointment or salve which cures everything. This is called "Old Maids' Salve," or some such name, and the sellers may often be known by the pile of little chip or willow boxes displayed in a shop or front window in back streets. "White" as they are, they often, it is suspected, give improper advice to women.

A third species of witch was recognised—a mixture of white and black, called grey witches, who could help and hurt.⁴

¹ *Saxon Leechdoms*.

² Eynatten, *Manualis Exorcismorum*, 1619, p. 220, quoted in *Saxon Leechdoms*, vol. i. Preface, p. xlv.

³ *Short Discoverie*, etc., 4to, London, 1612, p. 71.

⁴ Brand's *Popular Antiquities*, 1842, vol. iii. p. 6.

Blaise Pascal, when an infant a year old, was supposed to have been bewitched by an old woman, who ultimately confessed that she had in fact so influenced his health.

BLACK MAGIC.

The following "revelation" of the proceedings of sorcerers is from the *Mysteries of Magic* by Waite,¹ and was taken by him from the works of Eliphas Lévi.²

"They procure either some of the hair or garments of the person whom they wish to curse; then they choose an animal which they consider the symbol of that person by means of the hair or garments; they place this animal in magnetic rapport with the individual; they give it his name, then they slay it with one blow of the magic knife, open its breast, tear out the heart, which they envelop while still palpitating in the magnetised object, and for three days they hourly pierce this heart with nails, red-hot pins, or long thorns, pronouncing maledictions at the same time on the name of the bewitched person. They are then convinced (and often rightly) that the victim of their infamous manoeuvres experiences as many torments as if he had himself been probed to the heart with every one of the points. He begins to waste away, and at the end of a certain time dies of an unknown complaint." Another proceeding is to take a large toad, "baptism is administered to it, and it is given the name and surname of the person whom it is desired to curse; it is made to swallow a consecrated host whereon the formulæ of execration have been pronounced; then it is enveloped in the magnetised objects, bound with the hair of the victim, on which the operator has previously spat, and the whole is buried either beneath the threshold of the bewitched person's door or in a place which he is bound to pass daily."

The most important part of the body of a person to be bewitched is a tooth, but the hair or blood will answer fairly well.

THE EVIL EYE.

The use of red coral for warding off the evil eye is at least as old as the times of the ancient Romans; they used coral necklaces for their babies as we do now, but not for ornament so much as for protection from supernatural danger. In Italy, especially in the parts round Naples, red coral charms in the shape of a partly closed hand, or pieces of coral the shape of a tiny carrot, are worn for the purpose of protecting the wearer from being bewitched by the *mal occhio*.

¹ London, 1886, p. 167.

² *Dogme et Rituel de la Haute Magie*.

³ *Mysteries of Magic*, Waite, pp. 167, 168.

The last-named charm is evidently phallic.

The belief in witchcraft which still exists not only amongst the ignorant and degraded, but also amongst cultivated and intelligent persons, has recently been illustrated by two cases reported in the press, which it may be well to quote in this connection.

“EXTRAORDINARY SUPERSTITION.

“An inquest was held yesterday at Lufton, a village near Yeovil, on the body of Mary Jane Saunders, aged twenty-two, who died under peculiar circumstances. The evidence of the sister of the deceased showed the latter took to her bed last October. A doctor attended her, and in November she went into Yeovil hospital. Deceased had not had her reason for the last six weeks. Her father and mother called in a herbalist, who remained one day and night. Her mother thought her daughter was suffering from a ‘bad wish,’ and that it was in consequence of that she was ill. Her mother had heard that the herbalist had cured two people at Montacute of ‘bad wishes,’ and that was why they went to him. The herbalist made some herb tea for deceased to get rid of the ‘bad wish.’ Her father and mother thought the deceased had been ‘overlooked.’ The father told the coroner he was ‘overlooked’ when he was a baby, and had a spell on him, and some one did him good. The herbalist who visited deceased said he thoroughly believed one person could put a spell on another. It was in the Bible, but it was a pity it should be so. The mother of deceased said they thought some one had cast a ‘bad wish’ over the deceased, and they tried to get it taken away. They paid 11s. for the herbalist’s medicine to remove the ‘bad wish.’ Dr. Walters said deceased died of inflammation and softening of the brain, and a verdict in accordance with that opinion was returned.”¹

The Daily Telegraph of November 21st, 1892, has the following:—

“TRIAL FOR WITCHCRAFT.

“BERLIN, Nov. 20.—The Court of Eichstaett in Bavaria has just given judgment in the action for slander arising out of the extraordinary case of exorcism which occurred some months ago in Bavaria, when a certain Father Aurelian exorcised a boy named Zilk in his parish, who was said to be possessed of a devil.

“Father Aurelian declared that the evil spirit entered the boy’s body through the witchcraft of a Protestant woman named Herz, and the latter accordingly instituted proceedings against him for slander. The ceremony of exorcism was performed in presence of a Capuchin friar,

¹ *Daily Chronicle*, June 11th, 1892.

named Wolf, and other persons, and Father Aurelian, in the report which he drew up of the case, declared that the devil only quitted the boy after long resistance.

"Friar Wolf, who was one of a long list of witnesses called for the defence, confirmed the correctness of the defendant's report as to the circumstances under which the exorcism had been performed.

"Father Pruner, the Provost of the Cathedral, who was called to give evidence as to the theological aspects of the matter, testified that, according to the teaching of the Church, the possibility of demoniac possession was indisputable; and he gave an account of the doctrine concerning demons and evil spirits. He declared that Father Aurelian had recognised the signs of possession as taught by the Schools, and had acted as he ought to have done under the circumstances. After pointing out that even the Civil Law recognised the possibility of covenants between mankind and the devil, he went on to affirm that the Church could compel the devil to speak the truth. This was to support the line of defence set up by Father Aurelian that before quitting the body of the boy the devil himself, speaking through the possessed, had informed him that Frau Herz had bewitched the boy by means of some fruit which she had given him.

"Prior Schneider, who was summoned as an expert in demonology, also explained his views on the spirit world.

"Herr Straub, the Public Prosecutor, said the question before the Court was not whether Father Aurelian had transgressed the law in exorcising the boy, but whether he had slandered the plaintiff. This, he maintained, the defendant had done, and he demanded damages to the extent of fifty marks, asking this small sum because it was not contended that Frau Herz had suffered any material loss through the allegations made against her.

"Frau Herz, in evidence, denied having bewitched the boy, and declared that the fruit had not been given to Zilk by her, but by a maid-servant. Her own children had also partaken of the fruit without suffering any ill effects. Ever since the slander spread by Father Aurelian, however, she had been called 'A witch' by the whole neighbourhood, and her children had been called 'Witch-children' by their comrades in school.

"Ultimately the Court gave judgment in accordance with the Public Prosecutor's demand, finding that Father Aurelian had uttered the slander, and imposing upon him a fine of fifty marks with costs, or five days' imprisonment."

How little power any cultivation of the mind, except that which is purely scientific, has against this degrading superstition!

CHAPTER VI.

MEDICAL SUPERSTITIONS.

Death and the Grave.—Sorcerer's Ointment.—Teeth-worms.—Disease Transference.
—Doctrine of Signatures.

SUPERSTITIONS CONNECTED WITH DEATH AND THE GRAVE.

THERE is a very common saying amongst ignorant persons, when they suddenly shudder without reason, that some one is walking over their grave. In New England it is believed that cramp in the feet can be cured by walking over a grave. Earth taken at midnight from a newly made grave is believed in some parts of England to have a curative effect. Crawling round newly made graves is thought useful in sickness in Devonshire. Churchyard grass has been used (as what has not?) as an antidote to hydrophobia. Even in Afghanistan graves have a reputation for curing diseases.¹

"In the middle ages the necromancers profaned tombs and compounded philtres and ointments with the grease and blood of corpses; they mixed aconite, belladonna, and poisonous fungi therewith; then they boiled and skimmed these frightful mixtures over fires composed of human remains and crucifixes stolen from churches; they added the dust of dried toads and the ashes of consecrated hosts; then they rubbed their foreheads, hands, and stomachs with the infernal ointment, drew the satanic pentacle, and evoked the dead beneath gibbets or in desecrated cemeteries."²

Baptista Porta gives the recipe for the sorceress' ointment in his *Natural Magic*. By means of this charm the witches were carried to their Sabbath. It was composed of children's fat, of aconite boiled with poplar leaves, and some other drugs; soot must be mixed with these, and the bodies of the sorceresses rubbed all over with the compound as they went to the Sabbath naked. Another recipe from the works of the same author runs thus:—

¹ Simpson, "Ancient Buddhist Remains in Afghanistan," *Fraser's Mag.*, New Ser., No. cxxii., Feb. 1880, pp. 197, 198.

² *Mysteries of Magic*, A. E. Waite (London, 1886), p. 135.

Recipe—*Suim, acorum vulgare, pentaphyllon, vespertillionis sanguinem solanum somniferum et oleum*, the whole to be well boiled and stirred to the consistence of an ointment.¹

Bits of the rope and chips from the gallows after the hanging of a criminal have long had a reputation in England as cures for headache and ague. The touch of a dead man's hand at the place of execution was formerly considered very efficacious for some complaints.

Dyer says that between Suffolk and Norfolk a favourite remedy for hooping-cough is to put the head of the suffering child into a hole made in a meadow for a few minutes. It must be done in the evening, with only the father and mother to witness it.²

A knife that has killed a man is an amulet worn against disease in China. A piece of skin taken with a black-handled knife from a male corpse which has been buried nine days is an Irish love charm.³

People in North Hampshire sometimes wear a tooth taken from a corpse, kept in a little bag, and hung round the neck, as a remedy for tooth-ache. Bones from churchyards have from old times been used as charms against disease. Coffin water is considered good for warts, and the water with which a corpse has been washed has been recently given to a man in Glasgow as a remedy for fits.⁴

TEETH WORMS.

A very curious remedy for tooth-ache is founded on the idea that the disease is caused by a worm, and that henbane seed roasted will extract the worm. *The Englishman's Doctor; or the School of Salerne*, an English translation of a book published in 1607, has a few lines on this superstition which runs thus:—

“If in your teeth you hap to be tormented,
By meane some little wormes therein do breed,
Which pain (if heed be tane) may be prevented,
Be keeping cleane your teeth, when as you feede;
Burne Francomsence (a gum not evil sented),
Put Henbane unto this, and Onyon seed,
And with a tunnel to the tooth that's hollow,
Convey the smoke thereof, and ease shall follow.”⁵

Every druggist even at the present day sells henbane seed for the same purpose; it is used by sprinkling it on hot cinders. The heat causes the seed to sprout, and an appearance similar to a maggot is produced, which is ignorantly supposed by the purchaser of the drug to have dropped from the tooth to which the smoke is applied. Very

¹ *Mysteries of Magic*, p. 157.

² Dyer, *English Folklore*, p. 154.

³ Denny's *Folklore of China*, p. 51; *Irish Popular and Medical Superstitions*, p. 3.

⁴ *Folk Medicine*, p. 99.

⁵ *Notes and Queries*, 5th S., vol. vi. p. 97.

strangely this belief that tooth-ache is caused by a worm is found all over the world.¹

That dental caries is actually caused by an organism (the *Leptothrix buccalis*), which is found in teeth slime, and the threads of which penetrate the tissue of the teeth after the enamel has been eaten away by acids generated by the fermentation of the food, is not of course known to peasants and ignorant persons ; they seem, however, to have in this instance anticipated a discovery in bacteriology.

DISEASE TRANSFERENCE.

When primitive folk found that diseases could be communicated from one person to another, that contagious and infectious complaints spread through a district with terrible rapidity and fatal effects, they began to argue that it must be possible to transfer diseases to other creatures than man. And so we find stomach-ache transferred from the patient to a puppy or a duck.² Hooping-cough is transmitted to dogs by hairs of the patient given between slices of bread-and-butter. Ague and scarlet-fever are transmitted to the ass on which the sufferer sits ; tooth-ache is passed on to a frog by spitting in its mouth. Even trees are considered able to relieve patients of ague. Mr. Tylor says : " In Thuringia it is considered that a string of rowan berries, a rag, or any small article touched by a sick person, and then hung on a bush beside some forest path, imparts the malady to any person who may touch this article in passing, and frees the sick man from the disease. This gives great probability to Captain Burton's suggestion, that the rags, locks of hair, and what not hung on trees near sacred places, by the superstitious, from Mexico to India, and Ethiopia to Ireland, are deposited there as actual receptacles for transference of disease."³

Innumerable transference superstitions are met with concerning warts, and these have doubtless arisen from the very remarkable manner in which they sometimes disappear. In some cases what are taken to be warts by those not skilled in skin diseases are merely a papular eruption of a fugitive kind, which suddenly appears on the back of the hands and as suddenly vanishes. As real warts, however, often arise from constitutional causes, they will naturally disappear with improved general health ; and this fact has been the fruitful parent of a host of superstitions.

Mr. Black gives several of these. He says : " Lancashire wise men tell us for warts to rub them with a cinder, and this tied up in paper, and dropped where four roads meet (*i.e.*, where the roads cross), will transfer

¹ *Folk Medicine*, p. 33.

² Pliny.

³ *Primitive Culture*, vol. ii. p. 137.

the warts to whoever opens the parcel. Another mode of transferring warts is to touch each wart with a pebble, and place the pebbles in a bag, which should be lost on the way to church; whoever finds the bag gets the warts." ¹

A common Warwickshire custom is to rub the warts with a black snail, stick the snail on a thorn bush, and then, say the folk, as the snail dies so will the wart disappear.

ANTIDOTES.

Another old medical superstition is that every natural poison carries within itself its own antidote. Galen, Pliny, and Dioscorides say that the poison of Spanish fly exists in the body, and the head and wings contain the antidote. "A hair of the dog that bit you," is the ancient way of stating a belief that the hairs of a rabid dog are the true specific for hydrophobia. The fat of the viper was long regarded as the remedy for its bite. In black-letter books on Demonology we learn that "three scruples of the ashes of the witch, when she has been well and carefully burnt at a stake, is a sure catholicon against all the evil effects of witchcraft." ²

THE DOCTRINE OF SIGNATURES.

By nothing have the annals of medicine been more disgraced than by the absurd and preposterous "Doctrine of Signatures." Dr. Paris, in his *Pharmacologia*, describes it as the belief that "every natural substance which possesses any medicinal virtues, indicates, by an obvious and well-marked external character, the disease for which it is a remedy or the object for which it should be employed." Thus the plant which is common in our woods, called "Lungwort" (*Pulmonaria officinalis*), was anciently considered good for chest complaints, because its leaves bear a fancied resemblance to the surface of the lungs. The root of the "mandrake," from its supposed resemblance to the human form, was a very ancient medicine for barrenness, and was so esteemed by Rachel (Genesis xxx. 14).

Pliny, Dioscorides, and other writers attribute peculiar virtues to the mineral *Lapis Aetites*, or eagle-stone, because the nodule within the stone rattles when it is shaken. "*Aetites lapis agitatus sonitum edit, velut ex altero lapide prægnaus.*" The yellow drug *turmeric* was held to be a cure for jaundice because it is yellow. Poppies have their capsules shaped somewhat like a skull, therefore they were considered appropriate to relieve diseases of the head. *Euphrasia*, our eye-bright, was a famous application for eye diseases, because its flowers are somewhat

¹ *Folk Medicine*, p. 41.

² Paris's *Pharmacologia*, p. 51.

like the pupil of the eye. Nettle-tea by the same rule is a country remedy for nettle-rash (urticaria). The petals of the red rose bear the "signature" of the blood, the roots of rhubarb and the flowers of saffron those of the bile.

A person who believes himself bewitched by execration and the interment of a toad, should carry about him a living toad.

Southey says,¹ "The signatures [were] the books out of which the ancients first learned the virtues of herbs—Nature—having stamped on divers of them legible characters to discover their uses." Every healing plant, it was thought, bears in some part of its structure the type or signature of its peculiar virtue. Oswald Crollius is supposed to have been "the great discoverer of signatures." Some of these strange fancies are as fantastic as those of Swedenborg. Walnuts were considered to be the perfect signature of the head, the shell as the skull and the convolutions of the kernel as those of the two hemispheres of the brain, the outer skin would represent the scalp. So the signature doctors used the husks for scalp wounds, the inner peel for disorders of the *dura mater*, and the kernel was "very profitable for the brain and resists poisons." The peony when in bud being something like a man's head was "very available against the falling sickness." Poppy-heads for the same reason were used "with success" in general diseases of the head. Lilies-of-valley were known by signature to cure apoplexy; as Coles says, "for as that disease is caused by the dropping of humours into the principal ventricles of the brain, so the flowers of this lily hanging on the plants as if they were drops, are of wonderful use herein."

Capillary herbs naturally announced themselves as good for diseases of the hair. The stone crop "hath the signature of the gums," and so was used for scurvy. The scales of pine-cones were used for the tooth-ache, because they resemble the front teeth. Prickly plants like thistles and holly were used for pleurisy and stitch in the side. Saxifrage was good for the stone; kidney beans ought to have been useful for kidney diseases, but seem to have been overlooked except as articles of diet.

¹ *The Doctor*, p. 59

CHAPTER VII.

THE EIGHTEENTH CENTURY.

The Sciences accessory to Medicine.—The great Schools of Medical Theory.—Boerhaave and his System.—Stahl.—Hoffman.—Cullen.—Brown.—Hospitals.—Bichat and the New Era of Anatomy.—Mesmer and Mesmerism.—Surgery.—The Anatomists, Physiologists, and Scientists of the Period.—Inoculation and Vaccination.

THE medical history of the eighteenth century affords but a meagre result, notwithstanding the brilliant talents and indefatigable industry of the famous men who devoted their energies to the healing art. Their great aim was to create systems of medicine which should be philosophical and complete.

It is not only in what is strictly the art of healing that the members of the medical profession have ever been amongst the greatest benefactors of the world, but in what are known as the accessory sciences many of the most distinguished, enlightened, and self-sacrificing of the heroes of science have been affiliated to the profession of medicine. Not only the heroes, but the martyrs of medicine, crowd the scientific calendar. The seventeenth and eighteenth centuries were fertile in the efforts to apply the results of discoveries in the physical sciences to the relief of human suffering. If these efforts were but partially successful, so far as medicine—considered apart from surgery—was concerned, it was not in consequence of less industry in that department, but because speculation and theorising about the causes of disease monopolised the attention which, if devoted to observation of facts, would have been fertile in result. Schools, Systems, and Sects were the chief product of the medical activity of the eighteenth century. Although not perhaps of much direct benefit to medicine, indirectly the study of the sciences accessory to it must have been of considerable benefit as an educational factor in the training of the intellect of physicians.

THE GREAT SCHOOLS OF MEDICAL THEORY.

Whewell, in his *History of Scientific Ideas*,¹ classifies the successive biological hypotheses under the heads: (1) THE MYSTICAL SCHOOL;

¹ Vol. ii. pp. 175, *et seq.*

(2) THE IATRO-CHEMICAL SCHOOL ; (3) THE IATRO-MATHEMATICAL SCHOOL ; (4) THE VITAL-FLUID SCHOOL ; (5) THE PSYCHICAL SCHOOL.

THE MYSTICAL SCHOOL found its most distinguished representative in Paracelsus ; it derived its doctrine of the *Macrocosm* and the *Microcosm* from the Neoplatonists, and was largely imbued with alchemy and magic, the doctrines of the Cabala and the fanciful interpretations of the Bible. Later Paracelsists, Rosicrucians, and other speculators of the same character, such as Sir Kenelm Digby, brought the Mystical School of Medicine down to the seventeenth century. Our modern Theosophists are striving to restore much of the mystical teaching of Paracelsus and his followers. Again we meet the "astral bodies," "the elementary spirits," the cabalistic interpretations of the Bible, and the astrological absurdities of a pre-scientific period.

THE IATRO-CHEMICAL SCHOOL really arose from PARACELSUS, who amongst many absurdities held much important truth. SPRENGEL indicates LIBAVIUS of Saxony as the person who first cultivated chemistry apart from theosophy, and he names ANGELUS SALA as his successor. LEMERY, in the middle of the seventeenth century, began to reform pharmaceutical chemistry. After PARACELSUS chemistry became an indispensable study to every physician. Our word *tartar*, the scale which forms on the teeth, is of Paracelsian origin. He taught that the basis of all diseases was a thickening of the juices and the formation of earthy matter, which he called *Turtarus*, because it burns like the fire of hell. After PARACELSUS we have VAN HELMONT, a true chemical discoverer who sought in chemistry a theory of disease of which his doctrine of fermentation in the body holds an important place. Next we have SYLVIVS, with his doctrine of the opposition of acid and alkali. Digestion he considered a process of fermentation or effervescence of the acid of the saliva and pancreatic juice with the alkali of the gall. When either the acid or the alkali predominated, disease was supposed to follow. The human body was regarded as a laboratory, the stomach as a sort of test tube. BOYLE made objections to the doctrines of this school, and HERMAN CONRING taught that the proper place of chemistry was not in physiology and pathology, but in pharmacy.

VIRIDET of Geneva endeavoured to prove that the fluids of the body are either acid or alkaline by experiment. RAIMOND VIEUSSENS declared that he had discovered an acid in the blood and a ferment in the stomach. HECQUET opposed him, and said that digestion was not a process of fermentation, but of trituration. PITCAIRN in England, BOHN and HOFFMAN in Germany, and BOERHAAVE in Holland opposed the iatro-chemists, and proved by observation that digestion is not fermentation, and that the acid and alkali theories of disease supported by SYLVIVS were

false. By the influence and authority of these eminent physicians, the reign of the chemical school of physiology was overturned. The great fault of the iatro-chemists was their neglect of the effect of the solids of the animal body; they assimilated the work of the physician, as Whewell says, to that of the vintner or the brewer.

THE IATRO-MATHEMATICAL OR MECHANICAL SCHOOL attacked, defeated, and superseded the iatro-chemists. According to this sect, the human body is a mere machine. Whewell explains that the Mechanical Physiologists came into existence in consequence of the splendid results obtained by the schools of Galileo and Newton. It was not so much the exposure of the weaknesses of the chemical physiology as the effects produced upon the world by the explanation of so many of the phenomena of the external universe by the men who had revolutionized astronomy by their discoveries; it was naturally hoped that that which served to explain the great world of matter might also elucidate the little world of man. Whewell divides the school into two parts—the Italian and the Cartesio-Newtonian sect. The Italian calculated and analysed the properties of the animal body which are undoubtedly purely mechanical, the Cartesio-Newtonians went much further than this and introduced many baseless hypotheses. The Italians occupied themselves with such calculations as the force of muscles and the hydraulics of the animal fluid. BORELLI was the first great investigator on these lines; his work *De Motu Animalium* (Rome, 1680), treats of the forces and action of the bones and muscles. JOHN and DANIEL BERNOULLI and HENRY PEMBERTON pursued the same line of research. The principles of hydrostatics were brought to bear on the questions of the blood pressure and the breath. KEILL endeavoured to estimate the velocity of the blood. The other school occupied itself with the corpuscular hypothesis in physiology. The organs were considered as a species of sieves. Both NEWTON and DESCARTES sought to explain physiology on a theory of round particles passing through cylindrical tubes, pyramidal ones through pores of a triangular shape, cubical through square openings. The diameter and curves of the different vessels formed subjects of calculations, and BELLINI, DONZELLINI, and GUGLIELMINI in Italy, PERRAULT and DODART in France, COLE, KEILL, and JURIN in England, devoted themselves to their study.¹

The investigation of the size and shape of the particles of the fluids, and the diameter and form of the invisible vessels, formed a large part of the physiology of the beginning of the eighteenth century. CHEYNE thought that fevers of the acute sort arise from glandular obstruction;

¹ Whewell, *Hist. of Scientific Ideas*, vol. ii. p. 184.

and MEAD, the royal physician and friend of Newton, explained the action of poisons on mechanical principles. The error of this school, as Whewell explains, lay in considering the animal frame as a lifeless compound of canals, cords and levers; the physicians, to its adherents, were merely hydraulic engineers. Some iatro-mathematicians were, in fact, at the same time teachers both of engineering and medicine.¹

THE VITAL-FLUID SCHOOL. The mechanical explanation of the motions of the animal body may satisfy some observers up to a certain point; there, however, they must confess their theory fails them. How does motion *originate* in the living frame? FRIEDRICH HOFFMAN, of Halle (b. 1660), assumed a principle, material, yet of a higher kind than the adherents of the mechanical sect were inclined to recognise. This principle is exceedingly subtle, and is endued with great energy. It is the ether diffused through all nature, and which has its seat in the brain of animals and acts upon the body through the nerves. This vital fluid operates by laws which at one time were explained on the principles of a higher mechanics, of which we know little, and at another on metaphysical grounds, of which we know less. Naturally the discoveries connected with electricity imported a new element into these speculations. The vital principle was then held to be a modification of the electric fluid. JOHN HUNTER discerned it in the blood. CUVIER believed the vital fluid to be nervous. The objections to the doctrine of a vital fluid "as one uniform material agent pervading the organic frame," are many. If the vital principle be the same in every part of the body, how does it happen that the secretions are all so different? How does the blood under the same influence furnish all the different fluids produced by the glands? How is it the liver secretes bile, the kidneys their peculiar fluid, the lachrymal gland the tears? The hypothesis of a vital fluid really explains nothing.

THE PSYCHICAL SCHOOL held the doctrine of an immaterial vital principle. This is at least as old as ARISTOTLE,² who attributes the cause of motion to the soul. According to that philosopher the soul has different parts: the *nutritive* or *vegetative*, the *sensitive*, and the *rational*. STAHL, the great discoverer in chemistry, opposed the physiological theories of HOFFMAN, and declared that there is something in living bodies which cannot be accounted for by mechanics or chemistry. "All motion," according to him, "is a spiritual act." Nutrition and secretion belong to the operations of the soul; but he overlooked the fact that these are not peculiar to animals, but are characteristics of vegetables, which have no soul. CHEYNE and MEAD, PATER-

¹ Whewell, *Hist. of Scientific Ideas*, vol. ii. p. 185.

² Περὶ Ψυχῆς, ii. 2.

FIELD and WHYTT in England inclined to Stahl's views. BOISSIER DE SAUVAGES defended them in France. HOFFMAN and afterwards HALLER opposed them, the latter inventing the theory of Irritability.

BOERHAAVE (1668-1738), professor of medicine at Leyden, was a man of varied and profound erudition, conversant with the teaching of the ancient philosophers and the Greek and Arabian physicians ; he was in addition fully conversant with all the discoveries connected with the healing art down to his own time. Beyond this he was a natural philosopher, chemist, botanist, and anatomist, and an indefatigable experimentalist. In teaching medicine he simplified its study as much as possible by rejecting the absurd and useless speculations which encumbered it, and putting in their place the facts which he believed his own experience and observation had enabled him to ascertain. He published his system of medicine in two volumes, one entitled the *Instructions or Theory* and the other the *Aphorisms or Practice of Medicine*. "These short treatises," says Dr. Thomson,¹ "which gave to medicine a more systematic form than it had previously exhibited, are remarkable for brevity, perspicuity, and elegance of style, for great condensation of ideas, and for the number of important facts which they contain relative to the healthy and diseased states of the human economy." The genius of Boerhaave raised the medical school of Leyden to the highest distinction. Princes in all countries sent him pupils ; Peter the Great took lessons in medicine from him, and so great was his reputation that when a Chinese mandarin directed a letter to him, "To the illustrious Boerhaave, physician in Europe," it was duly delivered. He held the study of Mind to form an important part of physiology. He taught that the change produced upon the extremity of the sentient nerve must be transmitted by the nerve to the brain before sensation can be produced. He considered the nerves to be hollow undulatory canals. He also held that each of the senses has its distinct seat in the common sensory or brain. His lectures on the mental faculties are full of varied and curious information. Considering the human body as a combination of various machines arranged in one harmonious whole, he endeavoured to explain its phenomena in health and disease on the principles of natural philosophy and chemistry to the almost entire exclusion of vital forces, which, however, he did not reject. He denied that all medical phenomena are to be explained upon mechanical principles. He lamented that "physiological subjects are usually handled either by mathematicians unskilful in anatomy, or by anatomists who are not versed in mathematics." Yet his system of physiology embraced

¹ *Life of Dr. Cullen*, vol. i. p. 102.

but a poor conception of the mystery of life. He says, "Let anatomy faithfully describe the parts and structure of the body; let the mechanician apply his particular science to the solids; let hydrostatics explain the laws of fluids in general, and hydraulics their actions, as they move through given canals; and lastly, let the chemist add to all these whatever his art, when fairly and carefully applied, has been able to discover; and then, if I am not mistaken, we shall have a complete account of medical physiology."

It is to BOERHAAVE that we owe the peculiar chemical idea of affinity, that mutual virtue by which one chemical substance loves, unites with, and holds the other (*amat, unit, retinet*). He called it love. "We are here to imagine, not mechanical action, not violent impulse, not antipathy, but love, at least if love be the desire of uniting." It is to BOERHAAVE, therefore, we are indebted for a view of chemical affinity which enables us to comprehend all chemical changes.¹

The idea of affinity as marriage naturally leads to analysis as divorce. Thus affinity, imperfectly understood before the time of Boerhaave, made analysis possible. One of the first to express this conviction was DR. MAYOW, who published his *Medico-Physical Tracts* in 1674. He shows how an acid and an alkali lose their properties by combination, a new substance being formed not at all resembling either of the ingredients. He explains that, "although these salts thus mixed appear to be destroyed, it is still possible for them to be separated from each other, with their power still entire."²

GEORGE ERNEST STAHL (1660-1734), chemist, was professor of medicine at Halle (1694)³ and physician to the King of Prussia (1716). He opposed materialism, and substituted "animism," explaining the symptoms of disease as efforts of the soul to get rid of morbid influences. Stahl's "anima" corresponds to Sydenham's "nature" in a measure, and has some relationship to the Archeus of Paracelsus and Van Helmont. STAHL was the author of the "phlogiston" theory in chemistry, which in its time has had important influence on medicine. Phlogiston was a substance which he supposed to exist in all combustible matters, and the escape of this principle from any compound was held to account for the phenomenon of fire. According to STAHL, diseases arise from the direct action of noxious powers upon the body; and from the reaction of the system itself endeavouring to oppose and counteract the effects of the noxious powers, and so preserve and repair itself.³ He did not consider diseases, therefore, pernicious in them-

¹ Whewell's *History of Scientific Ideas*, vol. ii. pp. 16, 17.

² Cap. xiv. p. 233.

³ Thomson's *Life of Cullen*, vol. i. pp. 177, 178.

selves, though he admitted that they might become so from mistakes made by the soul in the choice, or proportion of the motions excited to remove them, or the time when these efforts are made. Death, according to this theory, is due to the indolence of the soul, leading it to desist from its vital motions, and refusing to continue longer the struggle against the derangements of the body.¹ Here we have the "expectant treatment" so much in vogue with many medical men. "Trusting to the constant attention and wisdom of nature," they administered inert medicines as placebos, while they left to nature the cure of the disease. But they neglected the use of invaluable remedies such as opium and Peruvian bark, for which error it must be admitted they atoned by discountenancing bleeding, vomiting, etc.² Stahl's remedies were chiefly of the class known as "Antiphlogistic," or ante-febrile.

DE SAUVAGES (1706-1767), the French physicist, was a disciple of Stahl, and adopted his theory of soul as the cause of the mechanical action of the body. He invented a system of classifying diseases under the title of *Nosologia Methodica*, founded on the principles of natural history.

FRIEDRICH HOFFMAN (1660-1742) was a fellow-student with Stahl at Jena. He was the author of a system of medicine in some respects original. He distinguished in the human economy three principal agents: Nature, or the Organic Body; the Sentient Soul; and the Rational Soul; corresponding to the classification of the Scripture of body, soul, and spirit—a classification which originated doubtless in Indian philosophy. Hoffman did not admit with Stahl that the organic functions of the human body depend on the agency of an intelligent soul or any immaterial agent whatsoever, but are merely mechanical and chemical properties of the elements which compose our bodies. The functions most essential to life he considered to be the circulatory, secretory, and excretory motions, and these seemed to him to depend upon the dilating and contracting powers of the muscular fibres of the vascular system. These powers then he held to be the cause of the organic functions which depend on the animal spirits, an ethereal fluid contained in the nerves and the blood.³

Hoffman first made known the virtues of the Seidlitz waters; he also invented a nostrum which was popular for a long time, and called "Hoffman's Anodyne Liquor."

¹ Thomson's *Life of Cullen*, vol. i. pp. 177, 178.

² Cullen's Works, vol. i. pp. 405, 406.

³ Thomson's *Life of Dr. Cullen*, vol. i. p. 185.

PHYSICIANS.

ARCHIBALD PITCAIRN, M.D. (1652-1713), was a famous physician of Edinburgh. In 1692 he occupied a professor's chair at Leyden with great distinction. Among his pupils were MEAD and BOERHAAVE, who both attributed much of their skill to his tuition. On his return to Edinburgh he greatly interested himself in improving the teaching of anatomy. He begged the Town Council to permit the dissection of the bodies of paupers; and though the chief surgeons of the place did all they could to oppose his efforts, they were successful, and Pitcairn had the credit of laying the foundation of the great Edinburgh school of medicine. He insisted on the strict adherence to Bacon's method of attending to facts of experience and observation. "Nothing," he said, "more hinders physic from being improved than the curiosity of searching into the natural causes of the effects of medicines. The business of men is to know the virtues of medicines; but to inquire whence they have that power is a superfluous amusement, since nature lies concealed. A physician ought therefore to apply himself to discover by experience the effects of medicines and diseases, and reduce his observations into maxims, and not needlessly fatigue himself by inquiring into their causes, which are neither possible nor necessary to be known. If all physicians would act thus, we should not see physic divided into so many sects." In his *Dissertations* (1701) he discusses the application of geometry to physic, the circulation of the blood, the cure of fevers by purgation, and the effects of acids and alkalis in medicine. A learned and skilful physician, an accomplished mathematician, and a thorough classical scholar, he was not discreet in his political utterances. His library was purchased by Peter the Great of Russia.

JOHN RADCLIFFE, M.D. (1650-1714), was famous for "his magnificent regard for the advancement of learning and science." The Radcliffe infirmary and observatory at Oxford were built from funds bequeathed by him.

SIR HANS SLOANE, M.D. (1660-1753), was a physician whose noble museum and library were the foundation of the British Museum.

SIR RICHARD BLACKMORE, M.D. (1650-1729), wrote on inoculation for smallpox, on consumption, gout, rheumatism, scrofula, diabetes, jaundice, etc.

WALTER NEEDHAM, M.D. (died 1691), made important investigations in the anatomy of the foetus, and the changes of the pregnant uterus.

CLOPTON HAVERS, M.D. (died 1702), was the author of a standard

work on the bones, certain canals of which were called after him Haversian canals.

JAMES DOUGLAS, M.D. (1675-1742), was an excellent anatomist, who was one of the first to demonstrate from anatomy that the high operation for stone might be safely performed. He was a skilful accoucheur, an accomplished botanist, and a man of letters. Pope mentions him in the *Dunciad*, and in a note describes him as a physician of great learning and no less taste. He wrote several works, the most famous of which is *Myographiæ Comparatæ Specimen; or a comparative description of all the muscles in a man and in a quadruped; added is an account of the muscles peculiar to a woman*. London, 1707.

WILLIAM CULLEN, M.D. (1710-1790), was the first professor in Great Britain to deliver his lectures in the English language.¹ He was appointed lecturer on chemistry at Glasgow University in 1746, and in 1751 was chosen regius professor of medicine. In 1756 he became professor of chemistry in the University of Edinburgh; in 1760 he was made lecturer on materia medica. Dr. Cullen earned great distinction as a lecturer on medicine; he opposed the teaching of Boerhaave and the principles of the humoral pathology, founding his own teaching on that of Hoffman. His system was to a great extent based on the new physiological doctrine of irritability as taught by Haller.

He attached great importance to nervous action in the induction of disease, considering even gout as a neurosis.

His *First Lines of the Practice of Physic* was long exceedingly popular, but his fame as a medical writer rests on his *Nosology, or Classification of Diseases*. In all his labours Dr. Cullen aimed at the practical rather than the theoretical. "My business is not," he remarks,² "so much to explain how this and that happens, as to examine what is truly matter of fact." "My anxiety is not so much to find out *how* it happens as to find out *what* happens." Cullen invented no ingenious hypothesis, rather he new-modelled the whole practice of medicine; "he defined and arranged diseases with an unrivalled accuracy, and reduced their treatment to a simplicity formerly unknown."³

JAMES GREGORY, M.D. (1758-1822), exercised the greatest influence on the progress of medicine in England. As the successor of Cullen, and as the author of the famous *Conspectus Medicinæ Theoreticæ*, the name of Gregory, borne by many ornaments of British science, became still more distinguished.

SIR GILBERT BLANE, M.D. (born 1747), rendered important medical services to the State by his researches on the diseases incident to sea-

¹ Baas, *Hist. Med.*, p. 750.

² Works, vol. i. p. 442.

³ Thomson's *Life of Cullen*, vol. ii. p. 134.

men. He banished scurvy from the fleet by his arrangements for provisioning ships on foreign stations, particularly by making lemon juice a regular ingredient of diet.

SIR WILLIAM WATSON, M.D. (1715-1787), was a devoted botanist and student of electricity. His electrical researches raised him to a position of European fame. He was the first in England who succeeded in igniting spirit of wine by electricity; he was the first to note the different colour of the spark, as drawn from different bodies; and his researches in the power and accumulation of electricity, the nature of its conductors, etc., qualified him to take part in the experiments carried out in 1747 and 1748, by which the "electric current was extended to four miles in order to prove the velocity of its transmission."¹ The doctor's house in Aldersgate Street was long the resort of the most distinguished men of science in Europe. He was not less the benign and generous friend to the poor and suffering, than the ardent investigator of the secrets of Nature. His work *Experiments and Observations on Electricity* is quite a remarkable production considering the age in which it was published (1768).

ROBERT WILLAN, M.D. (1757-1812), was the founder of the science of skin diseases in England. His attention was directed in 1784 to the elementary forms of eruption, and on this basis he erected his magnum opus, *The Description and Treatment of Cutaneous Diseases* (1798).

JOHN BROWN (1735-1788), was a systematizer of medicine, whose popularity was even continental. He endeavoured to explain the processes of life and disease and the principles of cure upon one simple idea, the property of "excitability." The "exciting powers" are the external forces, and the functions of the body are stimulants, so that "the whole phenomena of life, health as well as disease, consist in stimulus and nothing else." Diseases he divided as *sthenic*, attended with preternatural excitement, and *asthenic*, characterized by debility.

Ninety-seven per cent. of all diseases, he declared, require a "stimulating treatment." One good result of this theory was that it introduced a milder treatment of disease than the bleeding and purging doctors of his time advocated. The theory was called the Brunonian, and received greater attention in Italy than in England.

JOHN MORGAN, M.D. (1736-1789), was born in Philadelphia. He wrote an essay on his graduation at Edinburgh (1763), wherein "he maintained that pus is a secretion from the vessels, and in this view anticipated John Hunter."²

¹ Munk's *Roll of the R. Coll. Phys.*

² *Ibid.*, vol. ii. p. 262. He published in 1765, *A Discourse on the Institution of Medical Schools in America*.

ROBERT JAMES, M.D. (1703-1776), was the inventor of the celebrated fever-powder which bears his name.

FRANCIS DE VALINGEN, M.D. (1725-1805), was a Swiss who practised in London. He was the first to suggest the employment of chloride of arsenic in practice. His preparation was admitted into the London Pharmacopœia.

ERASMUS DARWIN (1701-1802), a physician of Lichfield, was a true poet of science. His fame rests on the *Botanic Garden*, in which he describes the *Loves of the Plants* according to the Linnæan system. His most important scientific work is his *Zoonomia*, a pathological work, and a treatise on generation, in which he anticipated the views of Lamarck. He asks: "Would it be too bold to imagine that in the great length of time since the earth began to exist, perhaps millions of ages before the commencement of the history of mankind, would it be too bold to imagine that all warm-blooded animals have arisen from one living filament, which the Great First Cause endued with animality, with the power of acquiring new parts, attended with new propensities, directed by irritations, sensations, volitions, and associations, and thus possessing the faculty of continuing to improve by its own inherent activity, and of delivering down these improvements by generation to its posterity, world without end!" He believed that plants possess sensation and volition.

EDWARD SPRY, M.D. (lived in 1756). At the fire of Eddystone lighthouse an old man was injured by the fall of a quantity of molten lead upon him. Dying of his injuries in twelve days, he was examined by Dr. Spry, who stated that he found in the stomach a lump of lead three and three-quarter inches long by one and a half in breadth. As no surgeon would believe this story, Dr. Spry performed a number of experiments upon animals by pouring molten lead down their throats, with the result that at the Royal Society, Dr. Huxham, in his letter to Sir William Watson, "testified to his own belief in Mr. Spry's veracity."¹

JOHN COAKLEY LETTSOM, M.D. (1744-1815), was a learned and amiable philanthropist, who published several important medical and scientific works. His *Reflections on the Treatment and Cure of Fevers* and *The Natural History of the Tea Tree* appeared in 1772. He wrote the following lines:—

¹ *Philosophical Transactions*, vol. xlix. p. 477, and Munk's *Roll of the R. Coll. Phys.*, vol. ii. p. 282. This was one of the cases in which experiments on the lower animals have been of service to mankind. Mr. Spry's character for veracity seems to have been re-established by them.

"When patients sick to me apply,
I physics, bleeds, and sweats 'em.
Sometimes they live, sometimes they die :
What's that to me ? I. Lettsom."

He gave away immense sums in charity, he was not so unfeeling as his verse would make him appear.

WILLIAM STARK (1742-1770) was the earliest writer who distinguished between tuberculosis and scrofula.

JEAN ASTRUC (1684-1766), professor at Montpellier, the oldest of the celebrated French obstetricians, was the author of a work on the diseases of women from the pathological point of view.

JOHANN E. WICHMANN (1740-1802), a scientific physician of Hanover, in 1786 explained the cause of itch as due to the itch-mite passing from one individual to another. He experimented upon himself. BONOMO had, however, discovered the insect in the itch pustules in 1687.

Wichmann suggested the contagiousness of consumption, whooping cough, diarrhoea, and several other complaints.

J. P. FRANK (1745-1821) was "the founder of medical police as a distinct department of science."¹

HOSPITALS.

The condition of the hospitals for the sick in the eighteenth century was scandalous almost beyond belief. Thus, in the Hôtel Dieu of Paris, the mortality at one time was 220 per 1,000 ; a state of affairs which, however, we surpassed in the present century, when in the British hospitals at Scutari the mortality reached between 400 and 500 per 1,000. In both cases this was due to overcrowding. At the Hôtel Dieu two or three small-pox cases, or several surgical cases, or sometimes even four lying-in women would be packed into one bed. A large proportion of the beds were purposely made for four patients, and six were frequently crowded in.

JOHN HOWARD (1726-1790), the philanthropist, by his splendid and devoted labours in connection with the reform of prisons, hospitals, and lazarettos, drew attention to the means of preventing the communication of the plague and other infectious fevers. In the words of Burke his philanthropic spirit led him to dive into the depths of dungeons ; to plunge into the infection of hospitals ; to survey the mansions of sorrow and pain ; to take the gauge and dimensions of misery, depression, and contempt ; to remember the forgotten ; to attend to the neglected ; to visit the forsaken, and to compare and collate the dis-

¹ Baas, *Hist. Med.*, p. 648.

tresses of all men in all countries." Not the least of his services were those he rendered to the cause of sanitary science and public health.

THÉOPHILE DE BORDEU (1722-1776) was a professor of anatomy and midwifery at Montpellier. By his great work, *Recherches sur le Pouls*, he so enraged his professional brethren (who, like the Jews, always either maim or kill the prophets sent unto them), that he was attacked in his personal character with disgraceful malignity for several years. He rendered very great services to the progress of medical science. His physiology was far in advance of his age, and many men have found in his researches on the functions of the glands a mine of wealth for the establishment of their own reputation.

M. F. X. DE BICHAT (1771-1802) was a celebrated French anatomist and physiologist, whose great work, *Anatomie Générale*, was the foundation of the reform of French medicine at the intellectual awakening after the great revolution. Pathology, the science of disease, would have been impossible without such researches as those of Bichat. He first took a "commanding view," not merely of the organs of the body, but of the tissues of which they are built up. He resolved the complex into its elements, and investigated the structure of each. He completed the overthrow of the iatro-mathematical school, regarding the properties of the *living* tissues as *vital* actions. He classified the functions as *organic* and *animal*, and greatly aided in systematising the phenomena of life.

MESMERISM.

FREDERICK ANTON MESMER (1733-1815) studied medicine at Vienna. He embraced astrology, and believed in the influence of the stars on living beings. He came to think that cures might be effected by stroking with magnets; afterwards he discarded the magnets, and convinced himself that he could influence others by stroking them with his hands alone. In 1778 Paris was greatly excited over the miraculous cures of mesmerism. The medical faculty denounced him as a charlatan, though a Government Commission in its report admitted many of the facts, while tracing them to physiological causes. The Marquis de Puysegur revolutionised the art of mesmerism by producing all the phenomena without the mummeries and violent means resorted to by Mesmer. Dr. John Elliotson in England in 1830 successfully practised the art.

In 1845 BARON VON REICHENBACH declared he had discovered a new force which he called *odyl*, and in 1850 his *Researches on Magnetism* were translated into English by Dr. Gregory, professor of chemistry in the University of Edinburgh.

G. VAN SWIETEN (1700-1772) was a pupil of Boerhaave, and famous in the history of medicine as the founder of the Old Vienna School. He brought about the clinical teaching for which that school has since been so famous. Following the instructions of Paracelsus, he introduced into his practice the use of mercuric perchloride internally in the treatment of syphilis. His commentaries on Boerhaave were considered to be more valuable than the text itself.

DE HAEN (1704-1776), of the Hague, studied under Boerhaave, and having been recommended by Van Swieten, was invited to Vienna as president of the clinical school in the hospital of that city. Observation, and the simplest treatment in disease, especially in fevers, made up the chief part of his medical system. Purgatives and emetics and powerful medicines he would use only on the most urgent necessity. Hygiene, both for the patient and the state, he considered of the highest importance in medical education. Clinical thermometry received great attention from De Haen, who demonstrated that in what is considered by the patient the cold stage of fevers there is really a notable increase in the temperature.

JAMES YONGE (1646-1721), physician and F.R.S., wrote an important treatise on the use of turpentine as a means of arresting hæmorrhage, entitled *Currus Triumphalis de Terebintho*. He described the flap operation in amputations, and was acquainted with the principle of the tourniquet for the arrest of bleeding during operations.

JOHN ADDENBROOKE, M.D., died 1719, leaving by his will four thousand pounds to found a hospital at Cambridge, which now bears his name.

JAMES DRAKE, M.D. (1667-1707), wrote a work, once deservedly popular, entitled *Anthropologia Nova; or, a New System of Anatomy*.

JOHN ARBUTHNOT, M.D. (1658-1735), physician to Queen Anne, was a man of extensive learning and of great scientific abilities, characterized by Thackeray as "one of the wisest, wittiest, most accomplished, gentlest of mankind."

DANIEL TURNER, M.D. (1667-1741), achieved a certain fame as the inventor of an excellent ointment, still known as "Turner's Cerate," composed of oil, wax, and calamine.

RICHARD MEAD, M.D. (1673-1754), was the author of the *Mechanical Account of Poisons*, a work which at once established his reputation. He was elected a Fellow of the Royal Society in 1703. On the accession of George II. he was appointed physician-in-ordinary to the King. He was the friend of Radcliffe, and like him a generous promoter of science and learning and of unbounded charity to those in misery. It was Mead who persuaded Guy to bequeath his fortune to

found the noble hospital which bears his name. Mead was a political physician, and it is said by Miss Strickland that his prompt boldness occasioned the peaceable proclamation of George I. Mead's work on the diseases of the Bible, entitled *Medica Sacra*, is a curious and interesting treatise. Excellent physician as he was, he recommended pepper and lichen as a specific against the bite of a mad dog.

JOHN FREIND, M.D. (1675-1728), a learned and accomplished physician, is famous as the author of an elaborate work, *The History of Physick from the Time of Galen to the Beginning of the Sixteenth Century*. He laid the plan of this important work whilst a prisoner in the Tower, to which he was committed on suspicion of participation in the so-called "Bishop's plot." He was liberated after about three months' confinement by the firmness of Dr. Mead, who refused to prescribe for Sir Robert Walpole till he consented to admit him to bail.¹ During his imprisonment Freind wrote a Latin letter *On certain Kinds of Small Pox*.

How near the physicians of Mead's time came towards the discovery of the germ theory of infectious disorders may be seen from his account of the leprosy.² In this treatise he says it has been found by experiments that in the plague and other malignant eruptive fevers the infection once received into articles of clothing remains in them for a long time, and thence passes into human bodies, and "like seeds sown produces the disease peculiar to them." With reference to the retention of the infection by dry walls, he says, "I thought it probable that they may, by a kind of fermentation, produce these hollow, greenish, or reddish strokes," etc.

SURGEONS.

DOMINIQUE ANEL (1679-1730) was the famous French surgeon who invented the operation for aneurism, which Hunter afterwards modified and called by his own name.

He successfully treated lachrymal fistula, and invented several surgical instruments which are named after him.

J. L. PETIT (1674-1750) in 1718 invented the screw tourniquet for compressing bleeding arteries. He was one of the most famous surgeons in the brightest period of the art in France, and was besides an excellent ophthalmologist.

LE CAT (1700-1768) was the famous lithotomist, and opponent of the doctrines of Haller.

LE DRAN (1685-1770) performed the first disarticulation of the thigh.

MORAND (1697-1773) performed disarticulation of the upper arm.

¹ *The Gold-headed Cane*,

² *Medica Sacra* (1755), pp. 21, 22.

PIERRE JOSEPH DESAULT (1744-1795) was a great French anatomist and surgeon, who instituted a clinical school of surgery at the Hôtel Dieu in Paris. He frequently had an audience of six hundred.

He introduced many improvements in surgical practice and in the construction of surgical instruments.

G. DE LA FAYE (d. 1781), a great surgeon and oculist, also disarticulated the shoulder joint.

A. LOUIS (1723-1792) was a distinguished military surgeon.

R. B. SABATIER (1723-1811) was a distinguished surgeon, anatomist, and ophthalmologist, and a man of great and all-round information on medical subjects in general.

P. F. PERCY (1754-1825) was a military surgeon who introduced cold-water dressings into French surgery.

ANTONIO SCARPA (1748-1832), the famous Italian anatomist, held the chair of anatomy at Modena, was distinguished in every branch of anatomical research, and investigated the minute anatomy of the nerves and bones. He decided the long-debated question whether the heart is supplied with nerves in the affirmative. He wrote on diseases of the eye, on aneurism, and on hernia. He was an elegant scholar, "equally at home in the criticism of the fine arts and in the details of scientific agriculture."

Amongst the principal Italian surgeons of the century were BERTRANDI (1723-1797), TROJA (1747-1827), and PALLETTA (1747-1823).

Of the Germans the great names are, SCHMUCKER (1712-1786), RICHTER (1742-1812), and SIEBOLD (1736-1807), who first taught surgery clinically in Germany.

CALLISEN (1740-1824), the great Danish surgeon, and ANEL (1741-1801), the founder of the Swedish School of Surgery, are two famous names which must be remembered in the surgical history of the period.

WILLIAM CHESELDEN (1688-1752) was famous as a lithotomist and oculist. His dexterity in the performance of lithotomy caused marvellous legends to be told of him, it was even said that he had operated in fifty-four seconds. He published his *Anatomy of the Human Body* in 1713.

SAMUEL SHARP (1700-1778) excelled in nearly every branch of surgery, and was a skilful operator, who by his efforts to stimulate English surgeons to emulate the French did much to advance British surgery.

BENJAMIN GOOCH of Norwich, HEY of Leeds, and PARK of Liverpool, were also famous in this period.

PERCIVAL POTT (1713-1788) was a surgeon to St. Bartholomew's Hospital, London, whose life formed a sort of epoch in the history of

surgery in England. Samuel Cooper says of him¹ that he was in his time the best practical surgeon, the best lecturer, the best writer on surgery, the best operator of which the metropolis could boast.

JOHN HUNTER (1728-1793) was a physiologist and surgeon combined, unrivalled in the annals of medicine. He raised surgery, which before his time was little more than a mechanical art, to the rank of a scientific profession. As a pathologist and comparative anatomist, he rendered the greatest services to medicine and surgery. He dissected 500 different species of animals. One of the most brilliant surgical discoveries of the century was Hunter's operation for the cure of popliteal aneurism, by tying the femoral artery above the tumour and without interfering with it. He improved the treatment of rupture of the tendo achillis, and invented a method of curing lachrymal fistula, and of curing hydrocele radically by injection.

He was the first to describe phlebitis (inflammation of the veins), and he made the discovery that the white blood corpuscles are antecedent to the red. He investigated the subject of inflammation, the results of which he published in his *Treatise on the Blood, Inflammation and Gun-shot Wounds*. Other works of Hunter's are his *Treatise on the Natural History of the Human Teeth*, *A Treatise on the Venereal Disease*, and *Observations on Certain Points of the Animal Economy*. "His greatest monument is the splendid museum which he formed by his sole efforts, which he made too when labouring under every disadvantage of deficient education and limited means." His brother-in-law, Sir Everard Home, prepared the catalogue of the museum and then burned Hunter's manuscripts, probably that he might conceal the plagiarisms of which he had been guilty in writing his book on Comparative Anatomy. The Government purchased Hunter's museum from his widow for £15,000, upon condition that twenty-four lectures should be delivered every year to members of the college, and that the museum should be open to the public.

CHARLES WHITE, a Manchester surgeon (circ. 1768), was the first to introduce what is known as conservative surgery. He first resected² the humerus, and taught the reduction of shoulder dislocations with the heel in the arm-pit.

The German surgeons in the seventeenth century held simply the position of barbers; they began life by cutting hair, shaving, cupping and bleeding, and then rose to be dressers of wounds and ulcers, and to treat fractures and dislocations.³ In 1713, Berlin acquired its first

¹ *Surgical Dictionary*, art. "Surgery."

² Resection is the removal of the articular extremity of a bone, or the ends of the bones in a false articulation.

³ Puschmann, *Hist. Med. Education*, p. 422.

anatomical theatre for the instruction of military doctors and "medico-surgeons." Dresden and Hanover began to improve the education of clever barbers about the middle of the eighteenth century. The Military Medical School of Vienna was opened in 1781. Barbers and bathmen in the eighteenth century were trained into district medical officers and surgeons by a course of instruction lasting from two to three years. In Holland students were privileged to assist in operations at the hospitals. The first surgical clinic in Germany was established at Würzburg, in 1769. The Vienna surgical clinic arose in 1774. The greatest teacher of surgery in Germany, A. G. Richter, gave clinical instruction at Göttingen, in 1781.¹

G. M. THILENIUS in 1784 performed the first division of the *tendo achillis* for the cure of club-foot.

JUSTUS ARNEMAN (1763-1807) was a surgical professor at Göttingen, who wrote a system of surgery and advanced the study of diseases of the ear.

CAMPER (1722-1789), a Dutch surgeon of a mechanical turn of mind, made improvements in trusses. LEUQUIN, a Frenchman, was the first to employ steel springs in trusses (1663). TIPHARIE in 1761 introduced the double truss.²

OBSTETRICIANS.

JOHANN PALFYN (1649-1730), a celebrated obstetric physician, in 1721 invented, or rather re-introduced, a species of forceps in difficult labour.

HUGH CHAMBERLEN, M.D. (1664-1728), was the most famous man-midwife of his day. His name is for ever associated with the invention of the obstetric forceps—a noble instrument, which has saved more lives than any mechanical invention ever associated with the healing art. A monument was erected to his memory in Westminster Abbey, with a long Latin epitaph by Bishop Atterbury.

WILLIAM SMELLIE (1680-1763), a distinguished English obstetric physician, improved the midwifery forceps and suggested and performed various operations in obstetric practice.

WILLIAM BROMFIELD (1712-1792) founded the Lock Hospital, London. He invented a tenaculum (a fine sharp hook by which the mouths of bleeding arteries are drawn out). He was a celebrated operator, and wrote a work on surgery.

The Medical College of Philadelphia was the first institution estab-

¹ *Hist. Med. Education*, p. 427.

² Baas, *Hist. Med.*, p. 677.

lished in North America to give medical instruction. It was organized in May, 1765, by Drs. Shippen and Morgan. The University of Pennsylvania developed its medical department from this humble beginning.

ANATOMISTS, PHYSIOLOGISTS, BOTANISTS, ETC.

ALEXANDER MONRO (1697-1767) was a very eminent surgeon and anatomist of Edinburgh, whose Medical School owes more to him probably than to any other individual. He wrote on the *Anatomy of the Bones*, and an *Essay on Comparative Anatomy*.

FRANK NICHOLLS, M.D. (1699-1778), was a famous anatomist and physiologist at Oxford. "He was the inventor of corroded anatomical preparations, and one of the first to study and teach the minute anatomy of tissues, in other words, general, as distinguished from regional and descriptive anatomy."¹ He was one of the first to describe correctly the mode of the production of aneurism, and he distinctly recognised the existence and function of the vaso-motor nerves.²

BROWNE LANGRISH, M.D., was elected a Fellow of the Royal Society in 1734. He was the author of several medical treatises, one of which was entitled *Physical Experiments upon Brutes to discover a Method of dissolving Stone in the Bladder by Injections; to which is added a course of Experiments with the Lauro-Cerasus; on Fumes of Sulphur*, etc. 8vo. Lond., 1746. His researches on the action of cherry laurel water are said to have suggested the use of prussic acid in medicine.³

JOHN FOTHERGILL, M.D. (1712-1780), was a distinguished botanist, who collected a great number of rare plants from all parts of the world.

WILLIAM CRUIKSHANK (1745-1800) was an anatomist who discovered urea.

STEPHEN HALES (1677-1761), an experimental physiologist and pathologist, produced dropsy by injecting water into the veins of animals, and investigated by experiments on animals the relative movements of the blood.

ANTONIO VALSALVA (1666-1723), a great Italian anatomist, held the professor's chair at Bologna and wrote a valuable treatise upon the ear and its anatomy.

GIOVANNI SANTORINI (1681-1737) was a Venetian anatomist whose investigations in the anatomy of the larynx, nose, face, etc., have immortalised his name in connection with several structures of those parts.

¹ Munk's *Roll of the Royal Coll. Phys.*, vol. ii, p. 125.

² *Ibid.*

³ *Ibid.*, p. 130.

GIOVANNI B. MORGAGNI (1682-1772) was the great founder of pathological anatomy. He was a pupil of Valsalva. His famous book on pathological anatomy was not published until he was in his 79th year. He was the author of the maxim that "observations should be weighed, not counted." The researches in morbid anatomy carried out by Morgagni formed an epoch in the history of modern medicine, which may indeed be said to rest on the two methods of Sydenham and Morgagni. The work of the Italian anatomist was complementary to that of the English Hippocrates, who neglected anatomy. Morgagni and the "Encyclopædic Haller," whom we are next to consider, were two of the brightest medical lights of the century.

ALBERT VON HALLER (1708-1777), surnamed "the Great," was a Swiss physician of Berne, who was not only a distinguished scientist, but a man of letters and a famous poet. He studied comparative anatomy at Tübingen; in 1725 he removed to Leyden, which at that time was the first medical school in Europe. He visited England in 1727, and made the acquaintance of Sir Hans Sloane, Cheselden, Dr. James Douglas, and other eminent persons. Leaving London, he went to Paris, but having been detected by the police in dissecting in his lodgings, he had to leave France, and he went to Basle to continue his investigations in anatomy; there he studied mathematics under John Bernoulli, and, having imbibed a taste for botany, studied the flora of Switzerland, on which he afterwards published a work. In 1729 he returned to Berne and lectured on anatomy; invited in 1726 to accept the professorship of anatomy, surgery, and botany in the newly founded University of Göttingen, he removed to that city, and by his influence a botanical garden, an anatomical theatre, a school of surgery and midwifery were established there. In 1747 he published his most valuable work, the *Primæ Lineæ Physiologiæ*, which was used as a text-book in medical schools.

VAN SWIETEN (1700-1772), the pupil of Boerhaave, established the first clinical institution in Germany. He was with Sanchez the first to use corrosive sublimate in medicine. To his exertions it was due that the teaching of medicine was greatly improved in Austria.

J. F. MECKEL (1724-1774) was an anatomist whose researches on the nerves, blood-vessels, glands, etc., have greatly contributed to our knowledge of their physiological functions.

J. C. PEYER (1653-1712) and J. C. BRUNER (1653-1727) discovered the glands in the intestines which are known to this day by their names.

A. PACCHIONI (1665-1726) described the glands we call in his honour "Pacchionian." W. COWPER (1666-1709) discovered those which bear his name. M. NABOTH (1675-1721) described the struc-

tures we call ovula Nabothi. H. MEIBOM (1638-1700) discovered the glands of the eyelids named after him.

WALTER CHARLTON, M.D. (1619-1707), anatomist, a voluminous writer, was to some extent a follower of Van Helmont.

THOMAS FULLER, M.D. (died 1734), published several pharmacopœias and an account of eruptive fevers, with several other works.

NEHEMIAH GREW, M.D. (born about 1641), wrote *The Anatomy of Plants, with an Idea of a Philosophical History of Plants*, which Sprengel calls *opus absolutum et immortale*. Hallam says,¹ "no man, perhaps, who created a science has carried it further than Grew; few discoveries of great importance have been made in the mere anatomy of plants since his time." His great discovery was the sexual system of plants; "that the sexual system is universal in the vegetable kingdom, and that the dust of the antheræ is endowed with an impregnating power."²

He was the first to obtain sulphate of magnesia from the Epsom waters, and to investigate its properties. His treatise on Epsom salts was published in 1697.

WILLIAM BRIGGS, M.D. (died 1704), was famous for his "skill in difficult cases of the eye."

EDWARD TYSON, M.D. (died 1708), wrote on anatomy; he was the Carus of Garth's *Dispensary*, and the discoverer of "Tyson's Glands."

WILLIAM PITCAIRN, M.D. (1711-1791), was an accomplished botanist. He lived in the Upper Street, Islington, where he had a botanical garden five acres in extent, stocked with the scarcest and most valuable plants. He introduced into St. Bartholomew's Hospital a much freer use of opium in the treatment of disease, and especially of fevers, than had hitherto been customary, and that with the greatest benefit to the patients.

PETER SHAW, M.D. (1694-1763), greatly facilitated the study of chemistry in England by his translations of the chemical works of Stahl and Boerhaave, as well as by his own works. He edited the works of Bacon and Boyle, and published a number of books on medicine and chemistry.

WILLIAM HUNTER, M.D. (1718-1783), was an earnest and devoted anatomist and obstetrician. He was a pupil of Cullen, and was so successful a practitioner that he expended £100,000 upon his house and anatomical collection, etc. The Hunterian Museum of the University of Glasgow was formed from this collection. The famous John Hunter was his younger brother.

¹ *Literature of Europe*, vol. iv. p. 354.

² *Munk's Roll of the R. Coll. Phys.*, vol. ii. p. 408.

THOMAS DIMSDALE, M.D. (1711-1800), a celebrated promoter of inoculation for small-pox, acquired a great reputation and immense wealth by the process. Catherine II. of Russia paid him enormous sums for successful inoculations, and gave him a barony.

WILLIAM HEBERDEN, M.D. (1710-1801), lectured on *Materia Medica* at Cambridge. Dr. Munk¹ gives an interesting extract from one of Heberden's lectures on *Mithridatum* and *Theriaca*, the famous classic medicines; he proves that the only poisons known to the ancients were hemlock, monk's-hood, and those of venomous beasts, and that they had no antidotes for these. He says that the first accounts of powerful poisons concealed in seals or rings, poisonous vapours in gloves and letters, etc., are idle inventions of ignorant and superstitious persons.

BUFFON (1707-1788) was the celebrated French naturalist to whom "we owe our first clear and practical connection of the distribution of animals with the geography of the globe."

GEORGE ARMSTRONG in 1769 opened the first children's hospital in Europe; he was the physician who first devoted special attention to the diseases of children. Armstrong was a London man, and died 1781.

JOH. E. GREDRING (1718-1775) was a German physician who was the first to investigate "the seat, cause, and diagnosis of insanity."²

JAMES CURRIE (1756-1805) advocated the cold-water treatment of typhus fever patients, and thus introduced a method of treatment which in one form or another is used at the present time for reducing the temperature of the body in such cases. Currie determined the temperature by the thermometer.

LADY WORTLEY MONTAGU (1690-1762) is famous in the annals of medicine for her courageous adoption of the Turkish practice of inoculation for small-pox in the case of her own son. By her zealous advocacy she was instrumental in causing the practice to be introduced into England in 1721. Dr. Keith having subjected his son to the operation, experiments were conducted upon criminals by Maitland, and these having been successful, the Prince of Wales and the royal princesses were inoculated by Mead. On behalf of the Almighty, whose province was supposed to be trespassed upon by these and similar proceedings, the practice was violently opposed by the clergy and others.

EDWARD JENNER (1749-1823) introduced the practice of vaccination as a preventive of small-pox. He commenced his investigations concerning cow-pox about the year 1776. The practice of inoculation

¹ *Roll of the R. Coll. of Phys.*, vol. ii. p. 160.

² Baas, *Hist. Med.*, p. 713.

with the virus of small-pox, which had been introduced into England through the suggestion of Lady Wortley Montagu, indirectly led Jenner to his grand discovery. His attention was excited by finding that certain persons to whom he attempted to communicate small-pox by inoculation were not susceptible to the disease; on pursuing his inquiries he found that these persons had undergone cow-pox—a complaint common among the dairy-servants and farmers in Gloucestershire, and that these people were aware that cow-pox in some way was a preventive against the small-pox. Local medical men had long been acquainted with this idea, but had paid no attention to it, considering it merely a popular and groundless belief. Jenner's genius, however, led him to divine the truth of the matter and turn it to practical advantage. The disease which affects the udder of the cow was found to be inoculable in the human subject, and could be propagated from one person to another, rendering those who had passed through the complaint secure from an attack of small-pox. Having confided the fact of this discovery to some medical friends, it was taken up in 1796 by Mr. Clive, of St. Thomas's Hospital, who introduced vaccination into London. Vaccination was adopted in the army and navy, and Jenner was honoured by professional distinctions and a parliamentary grant of £20,000. He was made a Fellow of the Royal Society, and his fame and the benefits of his discovery were rapidly extended to continental nations.

BOOK VI.

THE AGE OF SCIENCE.

CHAPTER I.

THE NINETEENTH CENTURY.—PHYSICAL SCIENCE ALLIED TO MEDICINE.

Exit the Disease-Demon.—Medical Systems again.—Homœopathy.—The Natural Sciences.—Chemistry, Electricity, Physiology, Anatomy, Medicine and Pathology.—Psychiatry.—Surgery.—Ophthalmology.

WITH the dawn of modern science was sounded the death-knell of the disease-demon and its twin brother "Visitation." When the French Revolution, having at first intoxicated men, had had time to effect its really beneficent aims, the age of modern science was fairly inaugurated, and daily conferred some fresh blessing on the race. The beginning of the nineteenth century saw the steam engine rapidly approaching perfection. In 1801 took place the first experiment with steam navigation on the Thames. In 1814 steam was first applied to printing in the *Times* office. In 1829 locomotive steam-carriages were employed on railways at Liverpool. In the early years of the century the electric telegraph was being developed. Machinery began to take the place of hand labour in numberless branches of trade and industry. Nobler than these material blessings, however, was the awakening of the English people to a new and higher humanity. It seemed that as Science began to shower her gifts on our nation, it yearned to become the almoner of mankind, and in its turn to bless the world with the precious gifts of freedom, education, improved sanitation, and the means of developing the dormant higher powers of the species. The slave trade of England was abolished by Parliament in 1807. In 1834 the English government began to make annual grants in aid of education. Sanitary commissions were appointed in 1838 and 1844, which were of incalculable benefit, not only to our own national health, but in suggesting to other countries the means of improving the health and combating the ravages of preventable diseases. In the early years of the century Dr. Birkbeck founded Mechanics' Institutions, thus commencing the era of enlightenment for the working classes, which has resulted in raising the mental condition of our labouring and lower middle classes to a higher level than

that of any other nation of the old world. Everywhere schools sprung up, books and newspapers were multiplied, until everybody who could read had mental provender provided at a merely nominal rate.

In relation to the history of medicine, the science of the century has perhaps on the whole done greater service to the healing art by that which it has taught doctors to leave undone than by what it has taught them to do. It has arrested the murderous lancet of the blood-letting; it has stayed the hand of the purger, who merely bled in another manner; it has rescued the unhappy victims of mental disorders from their dungeons, their beds of straw, and the cruel lash of their keepers; it has liberated the invalid from the tyranny of the medicine-monger; it is no longer possible to force down any patient's throat such a mass of filthy concoctions as the following items of medicine enumerated in an apothecary's bill for attending one Mr. Dalby, of Ludgate Hill, which in five days amounted to £17 2s. 10d.

The items for *one day* (August 12) are :—

	s.	d.		s.	d.
An emulsion	4	6	Another bolus	2	6
A mucilage	3	4	Another draught. . . .	2	4
Jelly of hawthorn	4	0	A glass of cordial spirits	3	6
Plaster to dress blister	1	0	Blister to the arm	5	0
A clyster	2	6	The same to the wrists	5	0
An ivory pipe	1	0	Two boluses again	5	0
A cordial bolus	2	6	Two draughts again	4	8
The same again	2	6	Another emulsion	4	6
A cordial draught	2	4	Another pearl julep	4	6
The same again	2	4			

This is quoted in the *Historical Sketch of the Progress of Pharmacy in Great Britain*,¹ p. 17, not as an isolated case, but as an illustration of the practice of apothecaries when attending patients of the higher classes.

Homœopathy did much to remedy this state of affairs, and by deluding people into believing that the billionth of a grain of a certain drug skilfully manipulated was more effectual than the bolus and decoction of the medicine-monger, tended gradually to destroy the popular faith in the dosing system.

The student of medical history is often reminded forcibly of Tennyson's lines :—

“Our little systems have their day;
They have their day, and cease to be.”

As he reflects on the many schools, sects, and systems which have

¹ Published by the Pharmaceutical Society, 1880.

dominated the practice of physic, he will often, as he passes them in review one by one, ask mournfully with Hans Breitmann :—

“ Where ish dot barty now ? ”

Where now is the Iatro-mathematical School, the party of the Iatro-chemists, the Brunonian sect ? One and all vanished into the Ewigkeit !

To have maintained, in the zenith of their fame, that either of the great medical schools could ever have so completely perished would have been the rankest heresy ; to believe now that the germ theory of disease can ever be superseded is to be subjected to the charge, not of medical heresy alone, but of the completest ignorance of science. Yet there are some bold spirits who have dared even this. The history of the past forbids the cautious historian of medicine to make too sure of the permanence of any theory of disease or system of cure, but the germ theory has claims to our acceptance which far outweigh those of any other theories which we have reviewed. From the length of time it has been under construction, from the marvellous care and minute caution exercised by the profound scientists who have devoted their lives and utmost energies to the innumerable experiments which their researches have embraced, from the fact that not medical theorists merely, but sober-minded scientists as well as practical surgeons and physicians, have everywhere given their adherence to the germ theory of disease, we have good reason to believe that it will hold its ground as a theory of the cause—if not of much value as a system of cure—of a great number of the most serious maladies which afflict the races of men and animals.

MEDICAL SYSTEMS.

GIOVANNI RASORI (1762–1837), of Milan, introduced a theory which was a revival of Methodism combined with that of Brunonianism. The Methodists held a status strictus and a status lusus, Brown a sthenic diathesis and an asthenic diathesis.

Rasori taught a combination of these theories modified by his own. His doctrines were accepted by a multitude of learned and eminent medical men, yet his teaching was simply atrocious, and a study of it almost makes one despair of any real advance for the healing art. His system of therapeutics consisted in the endeavour to make a diagnosis of the disease by watching the effects of the remedies which make it better or worse ! Bleeding was held to be the best diagnostic means : if it did the patient good, the sthenic diathesis was assumed ; if it made him worse, the asthenic was demonstrated.

He administered enormous doses of powerful drugs, such as would be considered nothing less than simply poisonous now. Baas says he gave 1 to 4 grammes of gamboge for diarrhoea, and 60 to 90 grammes of saltpetre a day¹—doses which would be large for a horse.

The wonder is that anybody survived the treatment.

Homœopathy, faith-healing, peculiar-people treatment, anything, however heterodox, is better than this licensed system of murder, which actually received the adhesion of famous professors at Italian universities, where the art of medicine was supposed to be taught sixty years ago.

JOHANN A. ROESCHLAUB (1768–1835), a highly cultivated German physician, was the founder of a medical system on the “Theory of Excitement.” Life depends upon irritability which belongs to the natural disposition. To be healthy, the body must be in a state of moderate irritation and moderate excitability. Disease disturbs the happy medium upwards as hypersthenia, or downwards as asthenia; in other words, by inducing too much strength or actual debility.

JOHANN STIEGLITZ (1767–1840) was an eminent physician who opposed the theory of excitement, saying, “There is no such thing as one only saving system.” He was the founder of Etiological diagnosis (or diagnosis dependent on a knowledge of the causes of disease).

C. W. VON HUFELAND (1762–1836), professor at Jena, and afterwards in Berlin, opposed the theory of excitement. He used to say, “Successful treatment requires only one-third science and two-thirds *savoir faire*,” and, “To him who fails to make a religion of the healing art, it is the most cheerless, wearisome, and thankless art upon earth; indeed, in him it must become the greatest frivolity and a sin.”

F. J. W. BROUSSAIS (1772–1838), a physician of the vitalist school, was a devoted follower of Bichat, who made it his chief aim to find an anatomical basis for all diseases. He is particularly known for his theory that all fevers arise from irritation or inflammation of the intestinal canal. His long-exploded theory led to an enormous misuse of bleeding. He christened his system “Physiological Medicine,” which by directing attention to the morbid changes in the organs, led to the rise of the pathological school of Corvisart, Laënnec, and Bayle. The systems of Brown and Broussais must have destroyed, says Dr. De Noé Walker, more human beings than the whole revolutionary wars from 1793 to 1815.

SAMUEL C. F. HAHNEMANN (1755–1843), the founder of Homœopathy, was born at Meissen, near Dresden. He studied medicine at Leipsic, and afterwards at Vienna, graduating at Erlangen in 1779. In his first medical treatise he takes a despondent view of medical

¹ *Hist. Med.*, p. 868.

practice in general, and of his own in particular, as he is candid enough to own that most of his patients would have done better had they been let alone.

In a letter to Hufeland upon the necessity of a regeneration in medicine (1808), he declares that after eight years' practice he had so learned the delusive nature of the ordinary methods of treatment as to be compelled to relinquish practice. He devoted much attention to the science of chemistry.

Berzelius said of him, "That man would have been a great chemist had he not been a great quack." He translated Cullen's *Materia Medica* in 1790, and the necessary study of medicinal agents which this involved set him thinking of a new theory of disease and cure which should replace that which he had found so unsatisfactory; he came to the conclusion, as the result of his researches, that "medicines must only have the power of curing diseases similar to those which they produce in the healthy body, and only manifest such morbid actions as they are capable of curing in diseases."¹

He thus proceeded to lay down the homœopathic law that the power of medicines to alter the health must be *proved* on the healthy body. He endeavoured to discover a rule by which the effect of remedies might be ascertained, and which should supersede the old method of working in the dark.

Considering the endless powers which medicines possess, and feeling sure that the Creator intended them to have some purpose, and that to lighten the afflictions of the race, he felt that there must be a better way of employing them² than that which he considered had so grievously failed in the past. He was therefore henceforth the enemy of all empiricism. Antipathy, or the method by which contraries are cured by contraries, so that the diseased part is acted upon by something that opposes it, he considered a fatal error in medical practice. Contrary medicine he held could at best be palliative and temporary, not curative. He designated as Allopathy the method by which it is attempted to remove natural disease from one part by exciting artificial disease in another, or the principle of counter irritation.

The sciences of anatomy and physiology are quite superfluous to the homœopathist; the remedies being merely addressed to symptoms, the knowledge of their causes can have little or no concern to those who follow Hahnemann's doctrines. The application of a remedy for facial neuralgia, as Dr. Mapother points out,³ has been applied over the motor nerve of the face, the inventor being ignorant that it has no connection with sensibility.

¹ Letter to Hufeland.

² Medical Profession, p. 93.

Hahnemann taught that all chronic *m*aladies proceed from the itch.

Amongst other remedies for the itch, or psora, the swallowing of lice or a decoction of them was seriously recommended, because these parasites tickle the skin, and on the like-cures-like principle, would be beneficial for itch! ¹

THE NATURAL SCIENCES.

The Natural Sciences in the closing years of the eighteenth century began to render the most important services to the art of medicine, and from that time onwards it has marked its progress step by step with the advances of botany, chemistry, and physics. Linnæus invented a system of the classification of plants which Adanson, Jussieu, De Candolle, and others did much to improve; the anatomy and physiology, and even the pathology of plants were closely studied, with results of the greatest value to scientific medicine. Buffon excited the interest of men of science by his declaration that there is no essential difference between animals and plants, and that all organic life follows the same plan. He explained the geographical distribution of the animal kingdom. Hunter, Blumenbach, St. Hilaire, Cuvier, and others advanced the sciences of comparative anatomy and physiology, and Lamarck divided bony animals into *vertebrata* and *invertebrata*. Cuvier, by founding the doctrine of types, explained the general plan on which animals are modelled. Pander and Baer rendered the greatest services to the study of development—the former by his researches on the development of the chick, the latter by his observations on the cleavage in the ovum. To Hunter, Kiemeier, and Owen in a later period we owe the most important discovery—that the higher animals, even man himself, in the embryo pass through the stages of development of the lower animals.

CHEMISTS.

JOSEPH PRIESTLY discovered oxygen in 1772, and thus introduced a new chemical era. LAVOISIER, however, was the first to observe the vast importance of the discovery, and CAVENDISH established his theories by his researches on the composition of the air, water, and acids. It is to Lavoisier's discoveries in relation to oxygen that physiology is indebted for the knowledge of the influence of that element on respiration and the blood. Doctors looked upon it as the "air of life," and in its excess or deficiency saw the causes of certain diseases. FOURCROY applied himself to the study of medical chemistry.

BERTHOLLET discovered the composition of ammonia, and the bleach-

¹ *Medical Profession*, p. 93.

ing properties of chlorine. He discovered chlorate of potash, and founded the doctrine of chemical affinity.

DALTON (1776-1844) by his atomic theory and his discovery of the law of multiple proportions still further advanced the science ; in 1794 he first described colour-blindness.

BERZELIUS (1779-1848) developed the atomic theory and improved our knowledge of animal chemistry.

GAY-LUSSAC in 1805, with ALEXANDER VON HUMBOLDT, discovered that water is composed of one volume of oxygen and two volumes of hydrogen.

SIR HUMPHRY DAVY (1788-1829) discovered the anæsthetic effect of nitrous oxide gas, invented the safety-lamp for miners, and greatly advanced the study of agricultural chemistry.

DUMAS (1800-1884) investigated the alkaloids.

PELLETIER in 1820 discovered quinine.

ORFILA (1787-1853), one of the most eminent men of the French school of medicine, founded modern toxicology, the science of poisons. His fame chiefly rests on his *Treatise of General Toxicology* (1814), which is a vast mine of experimental research on the symptoms of every kind of poisoning.

SIR WILLIAM HYDE WOOLASTON, M.D. (1766-1828), was a distinguished philosopher and chemist. One of his great discoveries was the malleability of platinum, which is said to have produced him no less than thirty thousand pounds. He was even more famous as a student of ophthalmology than as a chemist.

MICHAEL FARADAY (1791-1867) was the great chemist, whose glory in chemical science was overshadowed by his electrical discoveries.

JUSTUS VON LIEBIG (1803-1873) influenced the history of chemistry by his successful efforts to spread the knowledge of the science by improving the methods of investigation, and above all by the application of chemistry to physiology, agriculture, and the arts.

ELECTRICIANS.

The history of electricity has an important bearing on that of medicine. It will be necessary at least to indicate the chief points in its progress. GILBERT published a treatise on the magnet in 1600. He speaks of magnetic phenomena, and the extravagant stories circulated about the attraction of magnets and amber by persons who gave no reason from experiment. He distinguished magnetic from electric forces,¹ and it is to him that we owe the term "electric" itself.²

¹ *De Magnete*, p. 48.

² Whewell, *Hist. Induct. Sciences*, vol. iii. p. 7.

Boyle repeated the experiments of GILBERT, but seems to have made no discoveries. OTTO GUERICKE, of Magdeburg, next discovered that there is electric force of repulsion as well as of attraction. HAWKSBEЕ, in his *Physico-Mechanical Experiments*, 1709, observed the effects of attraction and repulsion on threads hanging loosely. DUFAY, in 1733, 1734, and 1737, observed that electric bodies attract all those that are not so, and repel them as soon as they are become electric by the vicinity or contact of the electric body. In 1729, GREY discovered the properties of *conductors*.

FRANKLIN distinguished between positive and negative electricity in 1747, and demonstrated the identity of the electric spark and lightning in 1752. GALVANI in 1791 laid the foundation of the Galvanic Battery. VOLTA discovered the "Voltaic pile" in 1800. Henceforward year by year the science progressed by leaps and bounds. The use of the magnet in medicine was known to Aetius, who lived A.D. 500. He says: "We are assured that those who are troubled with the gout in their hands or their feet, or with convulsions, find relief when they hold a magnet in their hand." Beckmann says¹ this is the oldest account of this virtue of the magnet. The more ancient writers refer only to its internal uses. Lessing ascribes the external use of the magnet as a cure for toothache and other disorders to Paracelsus. Marcellus in the fifteenth century assures us that the magnet cures tooth-ache, as also does Leonard Camillus in the sixteenth century. Wecker about the same period says it cures headache. Porta (1591) confirms this, and Kircher (1643) states that it was worn about the neck to prevent convulsions and nervous disorders. Magnetic toothpicks and ear-pickers were extolled as cures for disorders of the teeth, ears, and eyes about the end of the seventeenth century.²

ANTHROPOLOGY.

JOH. F. BLUMENBACH (1752-1840), professor in Göttingen, was the founder of Anthropology. He collected a great museum of skulls, and was famous as a comparative anatomist. He wrote on physiology, anatomy, and natural history.

PHILOSOPHERS.

VON SCHELLING (1775-1854) taught that "God is the indifference of the ideal and real, soul and body, and the identity of subjectivity and objectivity. In a word, the All." He held that health is the harmony of reproduction, irritability, and sensibility; disease, the alteration

¹ *History of Inventions*, vol. i. p. 72.

² *Ibid.*, p. 74.

of dimensions of the organism, by which it ceases to be a pure, untroubled reflex of the All.

G. W. F. HEGEL (1770-1831) was the philosopher whose supreme principle was absolute reason, and to whom in a great measure is due what is known as Modern Materialism. He was opposed by R. H. LOTZE (1817-1884), a medical philosopher of Göttingen, the author of the *Mikrokosmos* and works on pathology, physiology, and psychology. He laid it down that the significance of the phenomena of life and mind would only unfold itself when by an exhausted survey of the entire life of man, individually, socially, and historically, we gain the necessary data for explaining the microcosm by the macrocosm of the universe. The world of facts and the laws of nature are only to be understood by the idea of a personal deity.

CHARLES DARWIN (1809-1882), grandson of Erasmus Darwin, startled and shocked the whole Christian world by his theory that man has possibly descended at a highly remote period from "a group of marine animals resembling the larvæ of existing Ascidians." He traced our ancestry through the fish, amphibian, marsupial, and ape species; a theory which, despite the original opposition it excited, is now generally accepted. He is best known in connection with medical science by his famous work, *On the Origin of Species by means of Natural Selection*, 1859, his *Descent of Man and Selection in Relation to Sex*, 1871, and *The Expression of the Emotions in Man and Animals*, 1872. At first his theory of the Descent of Man was held to teach that

"A very tall pig with a very long nose
Puts forth a proboscis quite down to his toes,
And then by the name of an elephant goes."

Darwin recognised not merely a God but a Creator.

ANATOMISTS AND BIOLOGISTS.

SIR RICHARD OWEN, M.D., F.R.S., etc. (1804-1892), the celebrated comparative anatomist and palæontologist, made it possible for us to see what the extinct monsters were when he enabled us to construct scientifically the models of the megatherium, plesiosaurus, and other animals of remote ages. It has been well said of him that "the most characteristic of his faculties was a powerful scientific imagination. Fragments of bone which might be meaningless to less alert observers enabled him to divine the structure and to present the images of whole groups of extinct animal forms."

At the suggestion of Dr. Abernethy (whose pupil he had been) he

was invited in 1828 to prepare the catalogue of the Hunterian collection in the museum of the Royal College of Surgeons, of which Mr. Clift (whom he eventually succeeded and whose daughter he married) was conservator. This great work largely occupied some of the best years of Owen's life, the three quarto volumes on the Fossil Vertebrates and Cephalopods of the collection not appearing till 1855. Meanwhile he had given to the world his *Odontography*, his *Lectures on Comparative Anatomy and Physiology* (which won a continental reputation), and his famous work on the *Archetype and Homologies of the Vertebrate Skeleton*. In 1849 he issued an important memoir *On Parthenogenesis*.

In 1856 Owen was appointed Superintendent of the Department of Natural History in the British Museum, which, through his untiring exertions, was at last to be suitably housed at South Kensington. In 1861 he published his manual of *Paleontology*; from 1865 to 1877 a succession of works on British Fossil Reptiles and the Fossil Reptiles of South Africa.

F. G. HENLE (1809-1885) so early as 1840 advocated the germ theory of disease. It was first suggested, however, by Latour's discovery of the yeast plant in 1836.

ST. GEORGE MIVART, M.D., F.R.S. (born 1827), the distinguished anatomist and zoologist, is to a certain extent the opponent of Darwin, as he denies that the doctrine of Evolution is applicable to the human intellect. He is the author of many works on anatomy, biology, and zoology.

THOMAS HUXLEY, F.R.S., M.D. (born 1825), the famous physiologist and comparative anatomist and biologist, is a well-known writer on natural science, and the most prominent of the scientific opponents of revealed religion.

DR. ALFRED RUSSEL WALLACE (born 1822), the eminent naturalist, published his *Contributions to the Theory of Natural Selection* in 1870, and in 1878, in his volume *Tropical Nature*, still further contributes to our knowledge of sexual selection, etc.

ERNST HAECKEL (born 1834), a celebrated German naturalist and writer on science, is the chief supporter in Germany of Darwin's theories. It may be remembered in this connection that these were anticipated to some extent by Lamarck (1744-1829) and Goethe (1749-1832).

HERBERT SPENCER (born 1820) has devoted his life mainly to the working out of his "System of Synthetic Philosophy," which proposed "to carry out in its application to all orders of phenomena the general law of evolution."

GEORGE J. ROMANES, F.R.S. (born 1848), an ardent member of the Darwinian school, is a distinguished physiologist and biologist.

PHYSICIANS AND PATHOLOGISTS.

LEOPOLD AUENBRUGGER (1722-1809), a physician of Vienna, was the inventor of the method of detecting diseases of the chest by percussion. By striking the chest *directly* with the tips of the fingers (not as we do now by interposing a finger of our left hand while we percuss the chest mediately with the fingers of the other hand) he diagnosed by the sound evoked the condition of the organs of the thorax. His system was at first received with contempt and ridicule by his profession; but in 1808, Corvisart translated Auenbrugger's great work, the *Inventum Novum*, into French, and the method quickly achieved an European reputation.

RENÉ T. H. LAËNNEC (1781-1826), the celebrated French pathologist, was the inventor of the stethoscope. His great discovery was purely accidental—a fact which he declares in his famous work.

"In 1816 I was consulted by a young woman labouring under general symptoms of diseased heart, and in whose case percussion and the application of the hand were of little avail on account of the great degree of fatness. I happened to recollect a simple and well-known fact in acoustics, and fancied it might be turned to some use on the present occasion. The fact I allude to is the great distinctness with which we hear the scratch of a pin at one end of a piece of wood, on applying our ear to the other. Immediately, on this suggestion, I rolled a quire of paper into a kind of cylinder, and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of the ear." ¹

JEAN N. CORVISART (1755-1821) introduced into France Auenbrugger's method of percussion, one of the most important aids to *physical diagnosis*.

GASPARD L. BAYLE (1774-1816) made those important researches on tubercle and the changes in the lungs and other organs in consumption which form the basis of our present knowledge of the subject. From this time French physicians introduced great precision in their study of symptoms, so as to invest them with a really scientific character. Combined with the perfected methods of anatomical observation, a new era in clinical medicine dates from this period.

LOUIS (1787-1872) made important researches on pulmonary consumption and typhoid fever, and introduced the numerical or statistical method in medical science, which was an important step towards making it an exact science.

¹ Laënnec, *Treatise on Diseases of the Chest*, p. 5.

SIR ROBERT CHRISTISON (1797-1882) discovered the effects and properties of Calabar bean, and was the most famous of all English investigators of poisons and poisoning.

JOHN CHEYNE (1777-1836), in conjunction with WILLIAM STOKES (1804-1878), a great clinical teacher and author of works on diseases of the chest and heart, discovered the form of breathing in certain disordered conditions which is called "Cheyne-Stokes' respiration."

ROBERT J. GRAVES (1797-1853), a great observer and clinical teacher, gave his name to a disease.

SIR WILLIAM JENNER, M.D. (born 1815), was the first to establish beyond dispute the difference between typhus and typhoid fevers.

JOHN HUGHES BENNETT, M.D. (1812-1875), was the first to introduce the use of cod-liver oil in consumption into English practice (1841). He claimed also to have discovered leucocythemia before Virchow.

ALFRED SWAYNE TAYLOR, M.D. (1806-1880), was the founder of forensic medicine in England, and his great work on Medical Jurisprudence (published 1836) has long been the standard authority in medico-legal cases.

THOMAS HODGKIN (1797-1866) discovered the disease which goes by his name.

CHARLES MURCHISON, M.D. (1830-1879), is celebrated for his researches in epidemic diseases.

SIR THOMAS WATSON (1792-1882) was the author of the ever-popular lectures, *The Practice of Physic*, a work whose graces of style and elegance of phraseology entitle it to be considered a medical classic.

MATTHEW BAILLIE (1761-1823) was a famous pathologist. He devoted special attention to the pathology of the brain, heart, lungs, stomach, and intestines. It was he who first described the grey miliary tubercle of consumption. In all his profound researches he never failed to remember their practical end in the cure of disease.

JOHN ABERCROMBIE (1780-1844) is celebrated for his researches on diseases of the brain and spinal cord.

RICHARD BRIGHT (1789-1858), the reformer of renal pathology, was the discoverer of the disease which bears his name.

THOMAS ADDISON (1793-1860) discovered the disease of the suprarenal bodies which is called after him.

KARL V. ROKITANSKY (1804-1878), one of the most famous of the founders of the New Vienna School, was so indefatigable a pathologist that he is said to have celebrated his thirty-thousandth post-mortem in 1866. His great work, *The Handbook of Pathological Anatomy*, was published in 1841.

JOSEPH ŠKODA (1805-1881), a physician of the New Vienna School, improved physical diagnosis by his application of the laws of sound. He rendered percussion more perfect by correctly explaining the import of the various sounds heard on striking the chest. He threw great light upon our knowledge of the phenomena of heart diseases.

HEBRA (1816-1880) created a revolution in the science of skin diseases by basing it upon pathological anatomy.

WUNDERLICH (1815-1877) introduced the use of the clinical thermometer as an important aid to diagnosis, and claimed that "pathology is the physiology of sick men."

RUDOLPH VIRCHOW (born 1821), the constructor of the cellular pathology, is a celebrated German pathologist and anthropologist. On the basis of the cellular theory, which teaches that the cells live their own independent life, have their own active properties, proliferations and degenerations, Virchow built up his cellular pathology into a comprehensive system, attaching greater importance to the cell changes than to an altered condition of the circulation or quality of the blood, as was previously held to account for pathological changes. The theory explains many facts which were previously obscure, but is not wholly satisfactory. Virchow's system led to the foundation of pathological histology.

SIR ANDREW CLARK, M.D., F.R.S., President of the College of Physicians, London (born 1826), is a physician distinguished alike for his profound scientific knowledge and his admirable skill in its application to the relief and cure of disease. As a physiologist, anatomist, and pathologist, especially in connection with the organs of respiration, the kidneys, and digestive functions, Sir Andrew Clark occupies the foremost place in English medical practice of the time. He has written extensively on diseases of the chest, is one of the most brilliant clinical lecturers of the day, and for many years has been a chief attraction in the teaching power of the London Hospital.

SIR EDWARD H. SIEVEKING, M.D., etc. (born 1816), was with Dr. H. Jones joint-author of the well-known *Manual of Pathological Anatomy* (1854).

SAMUEL WILKS, M.D., F.R.S., etc. (born 1824), is an eminent pathologist and neurologist. He published his excellent *Lectures on Pathological Anatomy* in 1859.¹

¹ A few only of the more prominent physicians, surgeons, and scientists are mentioned here; to do more would interfere with the plan of this work.

BRAIN AND NERVE SPECIALISTS.

PHILIPPE PINEL (1745-1826), a French physician, published a translation of Cullen's *Nosology* (1785) in the language of his country. His claim to our gratitude rests on the fact that he was among the first to introduce the humane treatment of the insane. With his own hands he, when physician to the Bicêtre and Salpêtrière, removed the bonds of insane patients who had been chained to the wall for years.

SIR CHARLES BELL (1774-1842) made the greatest discoveries in physiology since those of Harvey. We owe to him the knowledge that in the nervous trunks are special sensory filaments whose office is to convey impressions from the periphery to the sensorium, and special motor filaments which convey motor impressions from the brain or other nerve centre to the muscles. This great discovery of the functions of the nerves, concerning which there previously existed much confusion amongst physiologists, was published in 1807, and entitles England to claim that in Bell and Harvey she has given to science the two most distinguished physiologists of the world.

FRANZ J. GALL (1757-1828) was a skilful Viennese anatomist, who, by his researches upon the anatomy of the brain, came to the conclusion that the talents and dispositions of men may be inferred with exactitude from the external appearance of the skull, and thus founded phrenology.

CASPAR SPURZHEIM (1776-1832), an anatomist, was a pupil of Gall, and assisted in the development of phrenology.

JEAN M. CHARCOT (born 1825) is a Paris physician greatly distinguished by his important investigations in diseases of the nervous system, upon which he has written many works.

PIERRE FLOURENS (1794-1867), a distinguished French physiologist, sought to assign their special functions to the brain, corpora quadrigemina, and lesser brain by experiments. In 1847 he directed the attention of the Academy of Sciences to the anæsthetic effect of chloroform upon animals. Chloric ether in the same year was used at St. Bartholomew's Hospital as an anæsthetic in operations by Dr. Furnell.

ARMAND TROUSSEAU (1801-1866) was an eloquent and popular clinical lecturer on medicine. He introduced tracheotomy in croup, and largely contributed to our knowledge of laryngeal phthisis, etc.

CLAUDE BERNARD (1813-1878), the celebrated experimental physiologist and pathologist, made numerous researches on the digestion of fat by the pancreatic juice, the formation of sugar in the liver, and the artificial production of diabetes by puncturing the fourth

ventricle of the brain, etc. He wrote *Physiologie et Pathologie du Systeme nerveux*, 1858.

BROWN-SEQUARD (born 1817), the experimental physiologist, discovered the vaso-motor nerves. He has investigated the functions of the spinal cord, its normal and pathological states, the brain and sympathetic nerves and ganglions, the inhibitory and other nerves.

PAUL BERT (1833-1886) was a physiologist and neuro-pathologist.

G. B. DUCHENNE (1806-1875) introduced electro-therapeutics by means of the induced current in diseases of the nervous system.

ROBERT REMAK (1815-1865) still further pursued the treatment of nervous diseases by means of the constant current. He investigated the subject of the parasitic origin of certain diseases of the skin, and produced favus experimentally.

ELIE VON CYON (born 1843) continued the investigation of electro-therapeutics.

MARSHALL HALL (1790-1857) discovered reflex action, which fact he communicated to the Royal Society in 1833.

JAMES BRAID, a Manchester surgeon, in 1841 investigated mesmerism, and discovered what is now called hypnotism. He found that he could artificially produce "a peculiar condition of the nervous system, induced by a fixed and abstracted attention of the mental and visual eye on one object, not of an exciting nature." Thus Braid was the first to investigate the subject scientifically, and to trace the phenomena of mesmerism to their true physiological cause. Dr. Rudolf Heidenhain, of Breslau, has recently traced these phenomena to inhibitory nervous action.¹

HENRY MAUDSLEY, M.D. (born 1835), is the author of several important works on mental diseases: *The Physiology of Mind*, *The Pathology of Mind, Body and Mind*, and *Responsibility in Mental Disease*.

JOHN CONOLLY (1796-1866) was physician to Hanwell Asylum. To him is due the honour of having first in England pressed upon the notice of his profession the advantages of the "No Restraint" system in mental diseases.

DR. FORBES WINSLOW was a popular and humane "mad doctor."

JOHN C. BUCKNILL, M.D., F.R.S., etc. (born 1817), is a distinguished student of mental diseases, and the author of several treatises on Unsoundness of Mind in relation to Crime and Drunkenness. He is one of the original editors of *Brain*, and for nine years he has edited the *Journal of Mental Science*.

DAVID FERRIER, M.D., F.R.S., etc. (born 1843), a specialist in

¹ *Ency. Brit.*, art. "Animal Magnetism," vol. xv. p. 279.

brain surgery, is well known for his researches in cerebral physiology and pathology, and has acquired great celebrity throughout the English-speaking world for his investigations connected with the localisation of the functions of the brain.

PAUL BROCA (1824-1880), the surgeon and anatomist, discovered that the faculty of speech lies in the third left frontal convolution of the brain, which in his honour is called Broca's convolution.

JULES BECLARD (1818-1887) was a distinguished French physiologist.

HENRY C. BASTIAN, M.D., F.R.S. (b. 1837), is a pathological anatomist and cerebral physiologist. His *Brain as an Organ of Mind*, 1880, is one of his best known works, and his articles in Quain's *Dictionary of Medicine*, on Diseases of the Spinal Cord and Nervous System generally, are equally valuable contributions to this department of medical science.

JOHN HUGHLINGS JACKSON, M.D., F.R.S., although distinguished as an ophthalmologist, is more famous for his researches and discoveries in connection with the nervous system and the localisation of cerebral functions.

DR. JULIUS ALTHAUS has made many valuable contributions to our knowledge of the nervous system.

VICTOR A. H. HORSLEY, F.R.S., etc., pathologist and brain surgeon, is the author of many papers on the functions of the brain and spinal cord, and has made important contributions to our knowledge of the functions of the thyroid gland, hitherto little understood, by which the treatment of myxœdema will, it is hoped, be greatly improved

SURGEONS.

The founding of museums of anatomy and surgical pathology by the HUNTERS, DUPUYTREN, CLOQUET, BLUMENBACH, BARCLAY, and a great number of other anatomists and surgeons, has greatly assisted to advance the practical surgery of this century. Some of the more important improvements in the art as practised at the present time are the following, which are given in the article on Surgery in the *Encyclopædia Britannica*:—The thin thread ligature for arteries, introduced by JONES, of Jersey (1805); the revival of the twisting of arteries to arrest bleeding by AMUSSAT (1829); the practice of drainage in large wounds and after operations by CHASSAIGNAC (1859); aspiration or the application of the principle of the air-pump for removing pus and fluid from tumours, etc., by PELLETAN and others; the plaster-of-Paris bandage and other similar immovable applications for fractures, etc. (an old Eastern practice recommended in Europe about 1814 by the English consul at Bassorah); the re-breaking of badly set fractures; galvano-

caustics and *écraseurs*; the general introduction of resection of joints (FERGUSSON, SYME, and others); tenotomy by DELPECH and STROMEYER (1831); operation for squint by DIEFFENBACH (1842); successful ligature of great arteries by ABERNETHY and ASTLEY COOPER (1806); crushing of stone in the bladder by GRUITHUISEN of Munich (1819), and CIVIALE of Paris (1826); cure of ovarian dropsy by the removal of the cyst, discovery of the ophthalmoscope, and great improvements in ophthalmic surgery by VON GRÄFE and others; application of the laryngoscope in operations on the larynx by CZERMAK (1860) and others, together with additions to the resources of aural surgery and dentistry.

In the treatment of fractures English surgery was inferior to that of continental practice, especially French, in the early part of the present century. M. Roux in 1814 pointed out our shortcomings in this respect, contrasting English with French methods much to our disadvantage.¹

SIR WM. BLIZZARD (1743-1835) was the first surgeon who tied the superior thyroid artery for goitre. He founded in conjunction with Maclaurin the medical school of the London Hospital.

BENJAMIN BELL (1763-1820), of Edinburgh, was the elder brother of Sir Charles Bell. He was professor of anatomy, surgery, and obstetrics, a man of letters and a famous operator. He published a *System of the Anatomy of the Human Body* and *The Principles of Surgery*.

JOHN ABERNETHY (1764-1831), the celebrated surgeon and lecturer on anatomy, became the founder of the distinguished school of surgery and anatomy at St. Bartholomew's Hospital, London.

SIR ASTLEY COOPER (1768-1841) was the first surgeon to tie the abdominal aorta.

SIR BENJAMIN BRODIE (1783-1862) was an anatomist and physiologist, as well as a distinguished surgeon.

ABRAHAM COLLES, M.D. (1773-1843), was an eminent Dublin surgeon, the author of a work on *Surgical Anatomy*, who has given his name to the fracture of the radius at the wrist.

JOHN BURNS, M.D. (1775-1850), was a teacher of surgery and midwifery at Glasgow. His world-wide reputation was gained for him by his *Principles of Midwifery*.

JAMES WARDROP (1782-1869) was the author of a well-known treatise on the pathology of the human eye.

BENJAMIN TRAVERS (1783-1858) was celebrated for his theory of "Constitutional Irritation."

¹ *Voyage fait à Londres en 1814*. See also Cooper's *Surgical Dict.*, art. "Fractures."

LISTON (1794-1847) was famous for his resections of the elbow and other joints.

SIR WM. LAURENCE (1783-1867) was one of the greatest clinical teachers the British school of surgery has produced.

GEORGE GUTHRIE (1785-1856) accompanied Wellington in his campaigns, and was in his time the great English authority on military surgery.

JAMES SYME (1799-1870) was a distinguished teacher of clinical surgery. He improved the operation of exarticulation at the knee-joint, and recommended the operation for amputating at the ankle which goes by his name.

SIR JAMES PAGET, F.R.S. (born 1814), the distinguished surgeon, is the author of the *Pathological Catalogue of the Museum of the College of Surgeons*, *Lectures on Surgical Pathology*, etc.

JOHN ERIC ERICHSEN, F.R.S. (born 1818), is the author of *The Science and Art of Surgery*, which has not only gone through nine large editions in this country, but has passed through many editions in America, and has been translated into German, Spanish, Italian, and Chinese (partly). Probably no treatise on English surgery has exercised so much influence on the progress of this branch of the healing art as Mr. Erichsen's noble work.

JONATHAN HUTCHINSON, F.R.S. (born 1828), one of the most distinguished surgeons of the Victorian age, is famous throughout the empire as a clinical teacher, especially in connection with specific and skin diseases.

SIR HENRY THOMPSON (born 1820), the distinguished surgeon and pathologist, is famous for his researches in the pathology of the urethra and prostate gland, and for his clinical teaching in lithotomy and lithotrity. He has taken an active part in the cremation propaganda.

SIR W. J. ERASMUS WILSON (1809-1884) was the famous specialist in skin diseases, whose munificent benefactions to the Royal College of Surgeons have enormously extended the resources of its museum and library.

GYNÆCOLOGISTS.

SIR T. SPENCER WELLS, M.D. (born 1818), the celebrated ovariologist, and MR. LAWSON TAIT, well described by Dr. Baas as "the magical operator and despiser of antiseptics," in abdominal diseases, especially those of women, are without rivals in the world as benefactors to humanity by their life-saving discoveries.

ANATOMY IN ENGLAND.

Until 1832 the bodies of executed murderers were ordered for dissection, by 32 Hen. VIII. c. 42, 1540. Surgeons were granted four bodies of executed malefactors for "*anatomyes*," which privilege was extended in the following reigns; but in consequence of the crimes committed by "resurrection men" in order to supply the medical schools, a new statute was passed in 1832, which prohibited the dissection of murderers, and provided for the necessities of the dissecting room by permitting, under certain regulations, the dissection of the bodies of unclaimed persons dying in workhouses, etc.

Inspectors of anatomy were appointed, and various regulations were made for the decent and reverent disposal of the remains. The Anatomy Act was passed in consequence of the scandals connected with the great Anatomy School at Edinburgh, at which Dr. KNOX was a celebrated teacher. It was discovered that a murderer named Burke provided bodies for surgeons by killing his victims by suffocation, leaving no marks of violence. The crime was known as Burking, and to remove the temptation to such scandals as the robbery of graveyards, and the murder of persons for the sake of the prices paid for their bodies, the wants of the surgeons were provided for in a legal manner.

FRENCH SURGEONS.

ALEXIS BOYER (1757-1833), one of the most eminent French teachers of surgery, wrote a great work on surgical diseases and operations, in eleven volumes.

JEAN D. LARRY (1766-1842) was a famous military surgeon under Napoleon. His opportunities for studying his profession must have been unique, as he participated in sixty great battles and four hundred engagements. He wrote several treatises on military medicine and invented field ambulances.

PHILIBERT J. ROUX (1780-1854), surgeon to the Hôtel Dieu at Paris, practised resections of joints, by which the articular diseased extremity of the bone is removed and a false joint formed.

JACQUES LISFRANC (1790-1847) was a famous amputator, whose operation for the partial removal of the foot is known by his name.

ARMAND VELPEAU (1795-1867) was a celebrated teacher of clinical surgery.

JOSEPH MALGAIGNE (1806-1865) was a very distinguished writer on surgical anatomy and operative surgery.

AUGUSTE NELATON (1807-1874) was called "the Napoleon of

Surgery." He invented the probe by which he detected the bullet in the wound of Garibaldi.

GERMAN SURGEONS.

Plastic operations were revived by C. F. VON GRAEFE, of Warsaw (1787-1840), DELPECH, DIEFFENBACH, B. LANGENBECK, and others. After severe burns there is frequently great loss of skin; it was found that this could be repaired by the transplantation of very minute portions of skin from healthy surfaces; periosteum and bones were also successfully transplanted.

VON KERN (1769-1829), the great Viennese surgeon, emphatically insisted that surgery could not be divorced from medicine. He adopted the very opposite treatment of wounds to that followed now by Lister; instead of excluding the air for fear of the germs contained in it, he insisted that operative wounds should be freely exposed to the atmosphere. He applied the simplest dressings of wet lint.

F. SCHUH (1804-1865) greatly advanced scientific surgery by advocating the use of the microscope in pathological anatomy.

VON WALTHER (1782-1849) was a great and scrupulously careful surgical operator, who, like Kern, declared that surgery and medicine are indivisible.

VON CHELIUS (1794-1876), a famous teacher of clinical surgery at Heidelberg, was a well-known writer on surgery.

.CONRAD J. M. LANGENBECK (1776-1851) and BERNHARD LANGENBECK (1810-1887) greatly contributed to found military surgery in Germany.

G. F. L. STROMEYER (1804-1876), a famous military surgeon of Germany, obtained great success in that department of operative surgery known as subcutaneous division of tendons for the relief and cure of deformities such as club foot.

FRIEDRICH ESMARCH (born 1823) is famous for his invention of the method of bloodless amputations of limbs by the use of the bandage of india-rubber which goes by his name.

AMERICAN SURGEONS.

VALENTINE MOTT (1785-1865), the celebrated New York surgeon, is said to have tied more arteries for the relief or cure of surgical diseases than any other surgeon.

SAMUEL GROSS (1805-1884), a great American teacher of surgery, was the author of the well-known *System of Surgery*.

OPHTHALMIC SURGEONS.

J. A. H. REIMARUS (1729-1814), of Hamburg, first employed belladonna in ophthalmic surgery.

JOSEPH BARTH (1745-1818), of Malta, founded an ophthalmic hospital, and first lectured on eye diseases and their treatment.

JUNG-STILLING (1740-1817) was a celebrated coucher of cataracts.

DR. THOMAS YOUNG (1773-1829) rendered great services to optical science, and was the first to describe astigmatism, or the want of symmetry in the anterior refracting surfaces of the eyeball—a disorder of vision which has considerable influence in causing headache.

J. A. SCHMIDT (1759-1809) first described syphilitic iritis; he called eye disease with great justice “the elegant diminishing mirror of diseases of the body.”

C. HIMLY (1772-1837) used mydriatics (dilators of the pupil, such as hyoscyamus and belladonna) in operations on the eye. Atropine afterwards superseded these.

G. J. BEER (1763-1821), a professor of Vienna, founded the famous teaching of the Vienna school of ophthalmology, and greatly improved the practice of the art and the instruments employed in it.

H. L. HELMHOLTZ (born 1821) invented that powerful aid to the ophthalmic surgeon—the ophthalmoscope—in 1851. It is said that the observation of the reddening of the pupil in a drowning cat first suggested the invention to Méry in 1704. Helmholtz's invention made scientific ophthalmology possible. This branch of surgery may be said to date from this great discovery.

HERMANN SNELLEN (born 1834), an oculist of Utrecht, introduced test types for ascertaining the distinctness of vision.

R. BRUDENELL CARTER, the eminent ophthalmologist, is a well-known and graceful writer on medical and scientific subjects.

CHAPTER II.

MEDICAL REFORMS.

Discovery of Anæsthetics. — Medical Literature. — Nursing Reform. — History of the Treatment of the Insane.

CONSERVATIVE SURGERY.

WHAT is known as “conservative surgery” is the distinguishing feature of the art as practised at the present day. Whatever Lord Tennyson may have had in his mind in his lines on the children’s hospital, the highest surgical practice now is to save diseased and injured parts as much as possible, instead of removing them. Antiseptic surgery and the discovery of anæsthetics have alone made this possible.

DISCOVERY OF ANÆSTHETICS.

The Chinese have a drug named Mago, by which they have been able, so they maintain, to destroy pain for thousands of years past. The vapour of hemp seed and the drug mandragora have for ages been employed for anæsthetic purposes previous to surgical operations. In Homer’s time the properties of opium were well understood, and other narcotic drugs were used for the same purpose. Patients were also sometimes stupefied by strong drink, and among some savage tribes banana wine was copiously administered so as to intoxicate the patient. It was not, however, until the discovery of the true anæsthesia produced by sulphuric ether and chloroform that grave surgical operations could be performed without causing pain to the patient. Nitrous oxide gas, discovered by Priestley in 1776, was recommended as an anæsthetic by Davy in 1800, and its use was begun in America by Wells, the dentist, in 1844. The discovery that by inhaling ether the patient is rendered unconscious of pain is due to Dr. C. T. Jackson, of Boston, U.S. Mr. T. Morton, of the same city, first introduced it into surgical practice in 1846. Chloroform was discovered by Souberain in 1831, and independently by Liebig in 1832. Dumas determined its composition in 1834. JACOB BELL in London, and Dr. SIMPSON in Edinburgh, first applied chloroform experimentally. The late Professor

James Miller thus describes the discovery of the anæsthetic effects of chloroform:¹ "The trial proceeded, and the safety as well as suitability of anæsthesia, by ether, became more and more established. But a new phase was at hand. My friend, Dr. Simpson, had long felt convinced that some anæsthetic agent existed superior to ether, and, in the end of October, 1847, being then engaged in writing a paper on 'Etherization in Surgery,' he began to make experiments on himself and friends in regard to the effects of other respirable matters—other ethers, essential oils, and various gases; chloride of hydrocarbon, acetone, nitrate of oxide of ethyl, benzine, the vapour of iodoform, etc. The ordinary method of experimenting was as follows: Each 'operator' having been provided with a tumbler, finger glass, saucer, or some such vessel, about a teaspoonful of the respirable substance was put in the bottom of it, and this again was placed in hot water, if the substance happened to be not very volatile. Holding the mouth and nostrils over the vessel's orifice, inhalation was proceeded with, slowly and deliberately, all inhaling at the same time, and each noting the effects as they advanced. Late one evening—it was the 4th November, 1847—Dr. Simpson, with his two friends and assistants, Drs. Keith and Matthews Duncan, sat down to their somewhat hazardous work in Dr. Simpson's dining-room. Having inhaled several substances, but without much effect, it occurred to Dr. Simpson to try a ponderous material, which he had formerly set aside on a lumber-table, and which, on account of its great weight, he had hitherto regarded as of no likelihood whatever. That happened to be a small bottle of chloroform. It was searched for, and recovered from beneath a heap of waste paper. And, with each tumbler newly charged, the inhalers resumed their vocation. Immediately an unwonted hilarity seized the party; they became bright-eyed, very happy, and very loquacious—expatiating on the delicious aroma of the new fluid. The conversation was of unusual intelligence, and quite charmed the listeners—some ladies of the family, and a naval officer, brother-in-law of Dr. Simpson. But suddenly there was a talk of sounds being heard like those of a cotton-mill, louder and louder; a moment more, then all was quiet, and then a crash. On awaking, Dr. Simpson's first perception was mental. 'This is far stronger and better than ether,' said he to himself. His second was to note that he was prostrate on the floor, and that among the friends about him there was both confusion and alarm." Each of the investigators related his experience of the new drug, and the experiments were repeated, always, however, on this first occasion, stopping short of unconsciousness. They were all convinced that the new agent had

¹ "Discovery of Chloroform," in Miller's *Surgery*, pp. 756–758, 2nd Ed.

full anæsthetic power when pushed. Thus was it satisfactorily proved that chloroform was something much better than ether. Dr. Simpson continued to pursue his experiments upon himself until he had perfected the method he had so happily discovered.

A curious incident connected with anæsthesia is mentioned by Dr. Paris in his well-known work *Pharmacologia*.¹ He relates an anecdote which he heard from the poet Coleridge, which illustrates the curative influence of the imagination.

"As soon as the powers of nitrous oxide were discovered, Dr. Beddoes at once concluded that it must necessarily be a specific for paralysis; a patient was selected for the trial, and the management of it was intrusted to Sir Humphry Davy. Previous to the administration of the gas, he inserted a small pocket thermometer under the tongue of the patient, as he was accustomed to do upon such occasions, to ascertain the degree of animal temperature, with a view to future comparison. The paralytic man, wholly ignorant of the nature of the process to which he was to submit, but deeply impressed, from the representation of Dr. Beddoes, with the certainty of its success, no sooner felt the thermometer under his tongue than he concluded the *talisman* was in full operation, and in a burst of enthusiasm declared that he already experienced the effect of its benign influence throughout his whole body. The opportunity was too tempting to be lost; Davy cast an intelligent glance at Coleridge, and desired his patient to renew his visit on the following day, when the same ceremony was performed, and repeated every succeeding day for a fortnight, the patient gradually improving during that period, when he was dismissed as cured, no other application having been used."

MEDICAL LITERATURE.

The greatest historians of medicine are the Germans. Especially valuable are the works of—

KURT P. J. SPRENGEL (1766–1833), of Pomerania, professor of medicine at Halle. He was a great botanist, but his immortal work on the History of Medicine eclipsed all his other labours for medical science.

HEINRICH HAESER (1811–1885), the author of the learned *Lehrbuch der Geschichte der Medicin und der Epidemischen Krankheiten*, which is one of the most popular works of this class.

DR. JOH. HERMANN BAAS, who is the author of the valuable and encyclopædic *Grundriss der Geschichte der Medicin*, excellently translated into English by Dr. H. E. Handerson, of Cleveland, Ohio (1889).

¹ p. 28.

DR. THEO. PUSCHMANN'S *History of Medical Education* has recently been translated into English by Mr. E. H. Hare (1891).

Amongst those of our own countrymen who have rendered great services to medical literature are—

SIR CHARLES HASTINGS (1794–1866), the founder of the British Medical Association.

SIR CHARLES SCUDAMORE (1779–1849), one of the greatest authorities on gout, who popularised Hydro-therapeutics by his writings.

SIR JOHN FORBES (1787–1861), founder of the Sydenham Society.

SIR RICHARD QUAIN, M.D., editor of the Dictionary of Medicine which bears his name.

MR. ERNEST HART (born 1836), editor (since 1866) of the *British Medical Journal*, which, by his great literary ability and scientific knowledge, has become the chief agent in the advancement of the British Medical Association to its present proud position amongst the scientific societies of the empire. Mr. Hart has rendered great public services in improving the condition of the sick poor in workhouses, and the creation of the metropolitan asylums. Mr. Hart's labours in connection with many questions of social and sanitary progress have been pre-eminently crowned with success.

NURSING REFORM.

When the nineteenth century had run half its course, FLORENCE NIGHTINGALE (born 1820) was providentially raised up to reform the working of hospitals, schools, and reformatory institutions, after the mismanagement of our military hospitals in the Crimea had led to terrible suffering amongst our wounded soldiers. Her noble devotion and self-sacrifice amongst the troops earned her the blessing of the nation, and her name will for ever be gratefully remembered in all questions connected with hospital reform and the improvement of nursing.

MRS. WARDROPER (died 1892), the exterminator of Mrs. Gamp and her sisterhood, made her mark in the Crimean War, and put her finger on some of the most flagrant abuses of the nursing system of the day. She was the first superintendent of the Nightingale School of Nursing, and the original trainer of technically educated nurses for hospitals and infirmaries.

THE TREATMENT OF INSANITY.

It is customary to divide the treatment of the insane into three periods—the barbaric, humane, and remedial. We must not, however, suppose that in ancient times the treatment was everywhere barbaric,

and that only in recent times has it become humane and remedial; nothing could be further from the truth. The treatment of persons mentally afflicted in ancient Egypt and in Greece was not only humane, but was probably remedial. In the temples of Saturn in Egypt, and in the Asclepia of Greece, which were resorted to by lunatics, Dr. J. B. Tuke thinks¹ the treatment was identical in principle with that of the present day. He praises the sound principles on which Hippocrates and Galen treated insane patients, and there is no doubt that it was directed towards a cure. With these exceptions little is known as to the treatment of the insane before the advent of Christianity. The earliest recorded case of the administration of medicine to an insane patient is that in which Melampus was the physician, and the neglect of the worship of Bacchus the cause of the malady. As Mr. Burdett well remarks,² nowadays the worship of Bacchus is responsible for much of the insanity which exists. From several accounts in the Greek poets we may assume that insanity prevailed in classic times in the forms with which we are now familiar. Hippocrates adopted a peculiar treatment in cases of suicidal mania. "Give the patient a draught made from the root of mandrake, in a smaller dose than will induce mania." He remarks that although the general rule of treatment be "*contraria contrariis curantur*," the opposite rule also holds good in some cases, namely, "*similia similibus curantur*." It is evident therefore that in some degree the Father of Medicine was in accord with Homœopathy.³

Whatever may have been the practice of the ancients, it is certain that in the Middle Ages the treatment of lunatics, up to the middle of the last century, was simply disgraceful. Little or no effort was made to cure or even to take proper care of the mentally afflicted. Some few were lodged in monastic houses, many in the common jails. In 1537 a house in Bishopsgate Street came into the possession of the Corporation of London, and was used to confine fifty lunatics. This was the first Bethlehem Hospital; it was removed in 1675 to Moorfields, and in 1814 the present hospital was built in St. George's Fields. St. Luke's was instituted in 1751.⁴ Many lunatics were executed as criminals or witches. It was not till the efforts of Pinel, Tuke, and Conolly were directed to the proper care and treatment of the insane that the barbarous period of European practice in regard to lunacy was happily ended.

¹ *Ency. Brit.*, art. "Insanity."

² *Hospitals and Asylums of the World*.

³ Adams' *Hippocrates*, vol. i. p. 77.

⁴ *Ency. Brit.*, art. "Insanity."

Mr. Bennett says :¹ "The Germans seem to have excelled all other nations in the ingenuity of the torture which they sought to inflict upon their patients. Some of them advocated the use of machinery, by which a patient, on first entering an asylum, was to be first drawn with frightful clangour over a metal bridge across a moat, and then to be suddenly raised to the top of a tower, and as suddenly lowered into a dark and subterraneous cavern. These practitioners avowed, according to Conolly, that if a patient could be lowered so as to alight among snakes and serpents, it would be better still." "One humane doctor invented an excruciating form of torture in the shape of a pump, worked by four men, which projected a stream of water with great force down the spine of the patient, who was firmly fixed in a bath made for this apparatus." Patients were taken to a bath in the ordinary way and allowed to bathe, but the bath had a bottom which gave way under their weight and plunged them into "the bath of surprise" underneath. Dr. Darwin is credited with having invented "the circulating swing" for lunatics; it was worked by a windlass, and was capable of being revolved a hundred times a minute. Esquirol approves this horrible instrument of torture, and speaks of it as having passed from the arts into medicine. Terror, cold water, shower baths, horrible noises, smells, darkness, were employed by the faculty in the treatment of insanity up to the beginning of the nineteenth century. The leaders of the French Revolution added starvation to the treatment. In England, in 1846, the diet in some of the licensed houses was starvation fare. Cruelty was identical in form in all the countries of Europe. Esquirol, in 1818, said, the insane were either naked or in rags, no bedding was allowed but a little straw, the stone cells were dark and damp, and the wretched patients were chained in caves not good enough for wild beasts. They wore iron collars and belts, and had no medical treatment but baths of surprise and occasional floggings. Even up to 1850 this state of things still existed in England.

In England, in 1820, one of the great sights of London was Bedlam. The keepers were allowed to add to their income by exhibiting the patients at one penny or twopence per head.

Doubtless the chief reason of the neglect and cruelty to which lunatics were thus subjected in Christian Europe, so long fruitful in all other works of mercy, was the theory of possession by an evil spirit; conjurations and exorcisms were considered the only safe and efficacious methods of expelling the demons. This grievous blunder is one of many illustrations which might be given of the necessity of making an accurate

¹ *Hospitals and Asylums*, vol. i. p. 62.

diagnosis before attempting to treat disease. Dr. Baas says¹ that lunatic asylums were established first at Feltre in Italy. The next were those of Seville, established in 1409; Padua, 1410; Saragossa, 1425; Toledo, 1483; Fez, 1492.

Burton, in his *Anatomy of Melancholy*, thus describes Lycanthropy, "which Avicenna calls *cucubuth*, others *lupinam insaniam*, or wolf-madness, when men run howling about graves and fields in the night, and will not be persuaded but that they are wolves or some such beasts. *Aëtius* (lib. 6, cap. 11) and *Paulus* (lib. 3, cap. 16) call it a kind of *melancholy*; but I should rather refer it to *madness*, as most do. Some make a doubt of it, whether there be any such disease. *Donat. ab Altomari* (cap. 9, Art. Med.) saith, that he saw two of them in his time. *Wierus* (De Præstiv. Demonum, l. 3, cap. 21) tells a story of such a one at Padua, 1541, that would not believe to the contrary but that he was a wolf. He hath another instance of a Spaniard who thought himself a bear. *Forestus* (Observat. lib. 10, de Morbis Cerebri, c. 15) confirms as much by many examples; one among the rest, of which he was an eye-witness, at Alcmaer, in Holland. A poor husbandman that still hunted about graves, and kept in churchyards, of a pale, black, ugly, and fearful look. Such belike, or little better, were King Proetus' daughters (*Hippocrates*, lib. de insaniâ), that thought themselves kine; and Nebuchadnezzar, in Daniel, as some interpreters hold, was only troubled with this kind of madness. This disease, perhaps, gave occasion to that bold assertion of Pliny (lib. 8, cap. 22, homines interdum lupos fieri; et contra), *some men were turned into wolves in his time, and from wolves to men again*: and to that fable of Pausanias, of a man that was ten years a wolf, and afterwards turned to his former shape; to Ovid's (Met. lib. 1) tale of Lycaon, etc. He that is desirous to hear of this disease, or more examples, let him read *Austin* in his eighteenth book, *de Civitate Dei*, cap. 5," etc., etc.

¹ *Hist. Med.*, p. 347.

CHAPTER III.

THE GERM THEORY OF DISEASE.

The Disease-Demon reappears as a Germ.—Phagocytes.—Ptoomaines.—Lister's Anti-septic Surgery.—Sanitary Science or Hygiene.—Bacteriologists.—Faith Cures.—Experimental Physiology and the Latest System of Medicine.

SOON after the discovery of the microscope, men began to seek for the causes of diseases in the infinitely little. ATHANASIUS KIRCHER (1598–1680), a Jesuit priest of Fulda, seems to have been gifted with the ability to foresee three of our greatest modern scientific discoveries. He anticipated Darwin's dictum that life is maintained by struggle and counter-struggle. He described hypnotism in certain animals, and detected, as he thought, micro-organisms with the microscope, then in its infancy, in the blood and pus of patients suffering with the plague and other infectious diseases, which "worms," as he termed the corpuscles, he considered to be the cause of the disease. His instrument had enabled him to discover that all decomposing substances swarmed with low forms of life. His theory, however, gained little credence at the time.¹ Next ANTONY VAN LEEUWENHOEK, "the father of microscopy," in 1675 published his researches in a series of letters to the Royal Society, in which he described minute organisms in waters, vegetable infusions, saliva, and in scrapings from the teeth, and he was able to differentiate these special forms of life. Some of his descriptions are so graphic that microscopists can almost recognise these forms as bacteria with which we are now familiar. Physicians still designating these as "worms" began to attribute to their influence various diseases.

In 1701 NICHOLAS ANDRY wrote on this subject a treatise entitled *De la Génération des Vers dans le Corps de l'Homme*. The germ theory of putrefaction and fermentation originated with Andry; he maintained that air, water, vinegar, fermenting wine, old beer, and sour milk contained myriads of germs; he detected these in the blood and pustules of small-pox, and believed that they could be found in other maladies. His views met with general acceptance, and curiously enough it was

¹ Cruikshank, *Bacteriology*, p. 2.

believed—and has since been verified by our own observation—that mercurial preparations were fatal to such disease germs.¹ LANCISI in 1718 attributed the unhealthy effects of malarial air to animalcules, and “inconceivable worms” met with as much ridicule in Paris in 1726 as the “microbe” has been received with to-day. Linnæus out of all this chaos thought order might possibly be evolved; he believed that the actual contagion of certain eruptive diseases might be discovered in these small living beings.

MARCUS ANTONIUS PLENCIZ in 1762 discussed the relation of animalcules to putrefaction and disease in his works.²

Notwithstanding all these clear indications, which, if followed up, would have been fertile in result, the germ theory of disease fell almost into oblivion. OTTO MÜLLER in 1786 began a more systematic study of the life history of various micro-organisms, and thus advanced the science of minute forms of life. The question arose, How do these forms originate? Dr. Needham was the first to suggest the theory of their spontaneous generation. Bonnet, of Geneva, disputed the results of Dr. Needham's experiments, and Spallanzani demonstrated by experiment the correctness of Bonnet's criticism.

FRANCIS SCHULZE in 1836, by a carefully devised experiment, struck another blow at Needham's theory of spontaneous generation. In 1837 SCHWANN convinced himself that the cause of decomposition must exist in the air. SCHROEDER and VAN DUSCH in 1854 proved that filtration of the air through cotton-wool was effectual in excluding germs. Then HOFFMAN in 1860, and CHEVREUIL and PASTEUR working independently in 1861, showed that a sterile solution could be kept sterile if the neck of the vessel were bent in the form of an S, so that the micro-organisms in the air entering the neck of the flask, would be deposited by gravitation in the curve.

But the advocates of the theory of spontaneous generation were not yet satisfied. They objected that by the boiling of the infusions, etc., under examination they lost the ability to become decomposed; but it was shown that the admission of unfiltered air set up decomposition. PASTEUR, BURDON SANDERSON, and LISTER next showed that blood, urine, and milk would not decompose if proper precautions were taken to avoid contamination. In 1872 CHARLTON BASTIAN endeavoured to rehabilitate the spontaneous generation theory, but TYNDALL effectually disposed of his contentions. It is settled that bacteria, or microbes, as these germs are now called, when once de-

¹ Woodhead, *Bacteria and their Products*, p. 52.

² *Opera Medico-Physica, Tractatio de Contagio, le Lue Bovina, de Variolis; de Scarlatina.*

stroyed by heat and by certain chemical agents in any medium, cannot be resuscitated, and that Harvey's axiom, *omne vivum ex ovo*, applies to all forms of organisms. As DR. SIMS WOODHEAD has said¹ concerning the battle between the advocates and opponents of the spontaneous generation theory:—

“The triumphs of surgery, of preventive inoculation of hygiene in relation to specific infective diseases, of preservation of food, have had their origin in the knowledge gained during the battle which waged round the question of spontaneous generation or *generatio equivoca*; and to the disciples of that school every acknowledgment must be made and due credit assigned for the attitude of scepticism, and free, ingenious, and honest criticism which they passed concerning half-formed and inadequately-supported theories and imperfectly-conducted experiments, for to their efforts is certainly due the fact that the experiments of their opponents became more and more perfect, and if to-day we have perfect methods of sterilization and of making pure cultivations, it is because nothing was taken for granted, and because able men on both sides of the controversy were ranged against one another to fight the matter to the death.”

Another question which had to be determined was whether these organisms were of the animal or vegetable kingdom. EHRENBERG came to the conclusion that in consequence of snake-like and rotary movements of certain micro-organisms they were animals; and this opinion held its ground till DAVAINÉ decided that bacteria must be considered as belonging to the vegetable kingdom. Up to 1852 the animal theory was unshaken; in 1854 COHN demonstrated the plant nature of bacteria.

In 1857 NÆGELI made a group of all the forms of lesser minute organisms, and termed it Schizomycetes, or fission fungi. The connection between micro-organisms and disease was the subject of research also in another direction. The discovery by LATUM and SCHWANN in 1837, that the yeast plant is a living organism, and the true cause of fermentation, threw great light on the whole inquiry. Many observers had long recognised the likeness of certain diseases to fermentation processes, and it gradually became the opinion that such diseases were similarly produced. In 1837 BASSI discovered that the silk-worm disease was due to microscopic spores on the bodies of sick worms, and that healthy worms became diseased when these spores were conveyed to them. HENLE in 1840 declared that all contagious diseases must be caused by the growth of something of a living nature, although he had searched in vain for the living contagion of small-pox and scarlet

¹ *Bacteria and their Products*, p. 59.

fever. When fungi were found to be the cause of favus, herpes tonsurans, and pityriasis versicolor, the theory received a still greater impetus. SWAINE, BRITTAN, and BUDD found micro-organisms in connection with cholera. In 1857 PASTEUR demonstrated that lactic, acetic, and butyric fermentations were produced by micro-organisms.¹ In 1863 DAVAINÉ came to the conclusion that the disease known as splenic fever is caused by an organised being which kills the animal by multiplying in its blood, and so changing its nature, after the manner of a fermentation process. PASTEUR next took up the investigation of silk-worm disease, and was ultimately able to confirm the opinion that the disease was due to micro-organisms, and to devise a remedy for it.

ROBERT KOCH in 1877 described the life-history of the bacillus of anthrax or splenic fever. PASTEUR also devoted much attention to the same subject, and confirmed the observations of Koch. PAUL BERT, on the other hand, argued that the bacilli were of no importance. Ultimately he was convinced of his error by Pasteur; it was, however, says PROFESSOR CRUIKSHANK,² "principally the researches of Koch which placed the doctrine of contagium vivum on a scientific basis. Koch elevated the theory of contagium vivum to a demonstrated and established fact."

The whole matter is beset with fallacies. Because certain bacteria have been discovered in the blood of animals suffering from a particular disease, it must not be rashly concluded that these bacteria are always its cause, they may be in some cases only its effects. At the present time the nature of the contagion in many diseases, such as hydrophobia, variola, vaccinia, scarlet fever, and measles, has not been discovered. The comma-bacillus is associated with cholera in some mysterious manner, yet experimenters have swallowed myriads of comma-bacilli, and have remained never the worse. Although Pasteur's prophylactic treatment against hydrophobia is based upon the theory that a micro-organism is the cause of the disease, Pasteur has never yet discovered the bacterium of hydrophobia, yet there would seem to be one. DR. SIMS WOODHEAD says:³ "It is a most remarkable fact that although no micro-organisms can be found in the virus, filtration through the Pasteur filter keeps back the effective part of the virus, whilst heating to 100° C. destroys the activity of the virus."

The disease-demon has now reappeared in the form of a germ.

¹ Schwann (1810-1882) discovered the influence of the lower fungi in causing fermentation and putrefaction, so that he may be called the father of the germ theory of disease.

² *Manual of Bacteriology*, p. 16.

³ *Bacteria and their Products*, p. 328.

THE PHAGOCYTE THEORY.

Some thirty-six diseases, many of which are amongst the most terrible which afflict men and animals, are attributed by bacteriologists to micro-organisms.¹ It is sufficiently alarming to reflect that enemies which can only be detected by a specialist armed with a powerful microscope are everywhere around us, waiting to attack us in a favourable spot, and slay us without hope of escape.

Yet the germ-theorists have not left us entirely without hope. One of Pasteur's most distinguished pupils, M. METSCHNIKOFF, offers us salvation through faith in his phagocytes. The white blood corpuscles are for ever on the watch for the incursions of disease germs. These they instantly arrest and imprison by taking them into their own substance, digesting and converting them to their own uses. Whenever there is an extra demand for the services of these admirable blood-police, a large number are attracted to the point where the burglarious and murderous enemy has entrenched himself; and if the system is in a position to maintain a sufficient force of these guardians of health, the enemy is rapidly digested, and the effete products are expelled by the regular physiological channels.

It has been found that men and animals may be insusceptible to an infective disease by natural immunity. Not all persons subjected to exposure to epidemic diseases contract them. Ordinary sheep readily succumb to anthrax, but Algerian sheep resist any but large doses of the virus.² Acquired immunity is that by which one attack, say of measles or of small-pox, protects against a second. Acclimatization also affords immunity. Pasteur, in his researches on fowl cholera, noticed that in non-fatal cases the disease did not recur. This set him to work out a theory of attenuated inoculations which should afford protection by giving the disease in a mild form in cultivations of the micro-organism. Pasteur next endeavoured to protect animals against anthrax by inoculating them with a mitigated virus. His results were criticised and his researches opposed by Koch, who came to the conclusion that the process did not admit of practical application, chiefly because the immunity would only last a year, and on account of the danger of disseminating a vaccine of the necessary strength.³ The theory of protective inoculation in hydrophobia has been much discussed. Pasteur's explanation does not entirely satisfy some experts. Dr. Sims Woodhead gives the following: "I am inclined to think that

¹ See Appendix E, *Cruikshank's Bacteriology*, p. 414.

² Cruikshank, *Bacteriology*, p. 192.

³ *Ibid.*, p. 196.

the explanation advanced by Wood and myself, that the treatment consists essentially in causing the tissues to acquire a tolerance before the microbe has had time to develop, is more in accordance with the facts. The tissue cells are acted upon by increasingly active virus, each step of which acclimatizes the cells for the next stronger virus, until at length, when the virus formed by the micro-organisms introduced at the time of the bite comes to exert its action, the tissues have been so far altered or acclimatized that they can continue their work undisturbed in its presence; and treating the micro-organisms themselves as foreign bodies, destroy them. When the cells are *suddenly* attacked by a *strong dose* of the poison of this virus, they are so paralysed that the micro-organisms can continue to carry on their poison-manufacturing process without let or hindrance; but when the cells are gradually, though rapidly, accustomed to the presence of the poison by the exhibition of constantly increasing doses, they can carry on their scavenging work even in its presence, and the micro-organisms are destroyed, possibly even before they can exert their full poison-manufacturing powers." ¹

PTOMAINES.

The germ theory has thrown great light upon the subject of certain mysterious organic poisoning processes, which long puzzled analysts and physicians. Diseased meat, fish, cheese, and other articles of food frequently cause symptoms of poisoning in those who have partaken of them. The analyst failed to detect the precise agent which caused the mischief, and it was not till the bacteriologists investigated the subject that it was satisfactorily explained. In 1814, BURROWS described a poisonous substance in decaying fish. In 1820, KERNER described a poisonous alkaloid which he discovered in sausages. In 1856, PANUM isolated a poison from some decomposing animal matter. ZUELZA and SONNENSCHNIG from the same substance obtained a poison which closely resembled atropine in its physiological action. SELMI between 1871 and 1880 described substances which he called cadaveric alkaloids or ptomaines. Pasteur and others, working in the same direction, have greatly advanced our knowledge of these deadly agents. Bacteria are now known to have the power to build up deadly substances as they grow in dead or living animal tissues, just as plants build up poisons in their own tissues; these substances exert a deadly influence on the nerve centres, and hence a cheese bacillus may be as dangerous to human life as a dose of aconite.

¹ Woodhead, *Bacteria, etc.*, p. 327.

LISTER'S ANTISEPTIC SURGERY.

What is commonly known as "Listerism" is a development of the germ theory of disease, which has revolutionised the art of surgery by its direct and indirect influence. Pus formation, the result of destructive processes which prevent the healing of wounds, was discovered to be due to the action of germs falling from the atmosphere on the injured flesh. LISTER sought to destroy these germs by powerful disinfectants. This was the first step in the antiseptic treatment. When carbolic-acid lotions were applied for this purpose, LISTER discovered that the wound healed rapidly. He believed that he had destroyed the micro-organisms by the carbolic-acid lotions. But LISTER improved on this process, and seeing how difficult it is to destroy the germs when they have once entered the tissues, he invented a method whereby they were prevented from gaining admission at all. He fought the micro-organisms in the atmosphere of the operating room, in the dressings, instruments, and hands of the operator, and thus gradually built up his system of absolute surgical cleanliness called antiseptic surgery. Even those surgeons who rejected his method in its entirety, and declined to adopt his complicated system of dressings, devoted so much attention to the minutest cleanliness, that they achieved results not less successful than those of the inventor of the antiseptic system itself.

SANITARY SCIENCE.

Hygiene, the art of preserving health, has always been recognised as a branch of medical science, not less important than that which concerns itself with the cure of disease. MOSES (B.C. 1490) enjoined the strictest cleanliness, and anticipated our modern sanitary laws. HIPPOCRATES embodied in his works treatises on hygiene, which existed in Greece probably long anterior to his time. The value of attention to rules of diet and exercise was recognised by HERODICUS, one of his preceptors, who introduced a system of medicinal gymnastics for the improvement of the health and the cure of disease. Such rules must to a greater or less extent have always been in force in any well-constituted army. Gymnasts, athletes, and others must have been fully aware of the necessity for attending to such rules. Hippocrates, in his treatise *Airs, Waters, and Places*, has insisted on the duty of the physician to study the effects of the seasons, the winds, the position of cities, and the diseases which are endemic and epidemic in them, the qualities of waters, and their effects on public health, and so forth. Had men taken up the study of Hygiene where Hippocrates left off, we should not have heard of the plagues, pestilences, and epidemics which up to modern times periodically devastated the civilized world.

HYGIENE.

Mr. PARKES, in the introduction to his *Manual of Practical Hygiene*, defines hygiene in its largest sense to signify "rules for perfect culture of mind and body." The two are not to be dissociated. Every mental and moral action influences the body; the physical conditions equally re-act upon the mind. He admirably says: "For a perfect system of hygiene we must combine the knowledge of the physician, the schoolmaster, and the priest, and must train the body, the intellect, and the moral soul in a perfect and balanced order. Then, if our knowledge were exact, and our means of application adequate, we should see the human being in his perfect beauty, as Providence, perhaps, intended him to be; in the harmonious proportion and complete balance of all parts in which he came out of his Maker's hands, in whose divine image, we are told, he was in the beginning made." Mr. Parkes asks if such a system is possible? He replies that we can even now literally choose between health and disease. There are certain hereditary conditions which we may not be able to avoid, and men may hinder our acquisition of the boon; but as a race man holds his own destiny in his hands, and can choose the good and reject the evil. Exit the disease-demon! Fevers and other epidemic diseases are no longer attributed to the anger of the Supreme Being; they may be prevented. If we use the words scourge, plague, visitation, and the like, it is merely because we recognise that Nature can take offence at our violation of her laws, and visit us with the penalty.

One of the most important events of our time, was the establishment of the Registrar-General's office in 1838. To DR. WILLIAM FARR we owe a nation's gratitude for the admirable manner in which he performed the duties of his office. The Government Inquiry into the Health of Towns and of the Country generally, undertaken by EDWIN CHADWICK, SOUTHWOOD SMITH, NEIL ARNOTT, SUTHERLAND, GUY, TOYNBEE, and others, was of immense importance to the national health. The medical officer to the Privy Council, SIMON, carried on the work thus ably commenced with the greatest vigour; and the consequence of the important departure was that medical officers of health were appointed to the different towns and parishes.

Various public health acts have followed from time to time, and it has been found, in the words of Mr. Parkes, that "nothing is so costly in all ways as disease, and that nothing is so remunerative as the outlay which augments health, and in doing so, augments the amount and value of the work done."

It is a reproach frequently brought against medicine that it makes

little advance. Some have even said that in some respects we are no better off than if we lived in the days of Hippocrates. However this may be, we may be justly proud of the splendid work which hygienic medicine has performed, and we have every reason to look hopefully forward to the benefits this branch of medical science will confer upon us in the near future. Hygiene is the outcome of physiology. Until we knew the laws of life, it was impossible that hygiene should have a scientific basis; and henceforth physiology and hygiene will go hand in hand.¹

JOHN SIMON, C.B., F.R.S. (born 1816), the eminent physiologist, pathologist, and surgeon, became the first appointed officer of health to the City of London. He was for some time medical adviser to the Privy Council. He rendered the greatest services to the health of the nation by his reports and official papers on sanitary matters.

EDMUND A. PARKES (1819-1876) was the great sanitary reformer whose name is gratefully enshrined in the "Parkes Museum of Hygiene," instituted in 1876, of University College, London.

LUDWIG J. P. SEMMELWEIS (1818-1865), "the Father of Antiseptic Midwifery," was professor in Pesth, and has earned the gratitude of his profession and of the whole world by demonstrating that puerperal fever was due to inoculation, that the poison which caused it was introduced by organic matter below the nails and epidermis of the students and doctors who had been engaged in anatomical or pathological work and had not taken sufficient pains to disinfect and purify their hands. He recommended careful washing with chlorine water before each examination; the consequence of which was, that the mortality among lying-in women fell in two months from twelve to three per cent. He anticipated the methods of Lister, and died in a lunatic asylum, galled by the attacks which his doctrines experienced.² Sir Andrew Clark said:³ "There are few such parallels in the history of science, in regard to his tremendous moral heroism; in spite of every conceivable difficulty, in positions of misrepresentation, in spite of persecution, he continued his labours, until crowned with a full clearing up of the difficulties. As to his martyrdom, there is not such a history. The persecution to which he was exposed in the later years of his stay in Vienna, his being hounded out of Vienna and settling in Budapest, and his premature end in loss of reason, form indeed a sad story, and one of the highest examples that can be presented."

¹ Parkes' *Hygiene*, Introduction.

² Baas, *Hist. of Med.*, p. 1083.

³ *Lancet*, Oct. 29th, 1892, p. 1013.

BACTERIOLOGISTS AND OTHER SCIENTISTS.

BENJAMIN W. RICHARDSON, M.D., F.R.S., etc. (born 1828). In 1865 he made important researches on the nature of the poisons of contagious diseases and discovered *septine*. In 1866 he discovered the use of the ether spray for locally abolishing pain in surgical operations. He introduced bichloride of methylene as an anæsthetic, and discovered the influence of nitrite of amyl over tetanus, angina pectoris, etc. He invented the *lethal chamber* for killing animals without pain, and has made many most important researches on the action of alcohol on man. In 1875 he gave a sketch of a "Model City of Health," to be called Hygeia, which awakened much interest and discussion.

JOHN BURDON SANDERSON, M.D. (born 1828), Professor of Physiology at Oxford, made investigations respecting the cattle plague, 1865-66. In 1883 he sat on the Royal Commission on Hospitals for infectious diseases, and has made elaborate researches on animal and plant electricity, and on the nature of contagion.

ROBERT KOCH (born 1843), the eminent bacteriologist, the discoverer of the "comma" bacillus, and the tubercle bacillus, is Professor of the Institute of Hygiene in Berlin.

JOHN TYNDALL, F.R.S. (born 1820), is one of the foremost of the scientific explorers of the century. Besides his researches in relation to magnetism, radiant heat, heat as a mode of motion, light, etc., Professor Tyndall has rendered very important services to medicine by his studies on *The Floating Matter of the Air in Relation to Putrifaction and Infection*, 1881.

LOUIS PASTEUR (born 1822), chemist, is celebrated for his researches relative to the polarization of light, and for his investigations on fermentation, the preservation of wines, and the propagation of zymotic diseases in silkworms and domestic animals. Pasteur's most important work for medicine was the demonstration of the existence of the germs which cause putrefaction.

The Minister of Public Instruction, addressing M. Pasteur on the occasion of his seventieth birthday, summed up what is known as Pasteurism in the following words: "Henceforward the formula is definitive and complete. Your disciples give it in two words—ferments and virus are living beings; vaccine is an attenuated virus, the basis of medicine is the artificial attenuation of virus, and thus the microbic treatment is founded."

Pasteur's later work has been chiefly in connection with the attempt to discover a prophylactic for hydrophobia.

LIONEL S. BEALE, F.R.S. (born 1828), physiologist and pathological

anatomist, is a celebrated microscopist, author of *The Microscope in its Application to Practical Medicine ; Disease Germs, their Supposed and Real Nature, and on the Treatment of Diseases caused by their Presence ;* and many other works of equal importance to medical science.

WILLIAM B. CARPENTER (1812-1885) was a celebrated physiologist, whose great work has done more to popularise the study of physiology amongst non-professional, as well as medical readers, than any other, except that of Professor Huxley, which followed it.

Amongst other scientific workers of the century may be mentioned PURKINJE, who rediscovered and described the bone corpuscles, contributed greatly to the study of microscopical anatomy and ophthalmology by his experiments with the ophthalmoscope.

R. WAGNER (1805-1864) in 1861 called an anthropological congress, which was attended by several distinguished anatomists, and thus originated the "Anthropological Congress."

PANDER (1794-1865) and BAER (1792-1876) made important researches in the history of development. To Baer is due the splendid discovery of the mammalian ovum.

FRANÇOIS MAGENDIE (1782-1855) was the first to introduce the experimental method into pathology and pharmacology. His investigations in what are called pharmaco-dynamics, chiefly connected with the alkaloids, introduced many of these powerful remedies into medical practice. He admitted a vital principle in nervous activity, but for the rest endeavoured to reduce medicine to mere physiological and chemical laws.

MIRACLES OF HEALING, FAITH CURES, MIND CURES, CHRISTIAN SCIENCE HEALING, ETC., ETC.

There are many things connected with the healing art on which the public mind is better informed than the recognised authorities on medicine. Mesmerism is now accepted by the faculty under the name of hypnotism, and the miracles of healing wrought at the shrines of saints, long the objects of scorn and contempt at the hands of the medical profession, are now declared to be well within the domain of scientific fact. The miracles of Lourdes, the faith cures at Bethshan, and similar phenomena, having been subjected to the strictest investigation by the most competent medical authorities, are proved to be not impostures and delusions, but simple matters of fact. Science having reluctantly accepted the faith-cure, now declares it to be "an ideal method, since it often attains its end when all other means have failed." ¹

¹ Professor Charcot in the *New Review*, Jan., 1893.

Professor Charcot, while declaring that the faith-cure is entirely of a scientific order, insists that its domain is limited ; "to produce its effects it must be applied to those cases which demand for their cure no intervention beyond the power which the mind has over the body." That is to say, faith will cure paralysis and other disorders of motion and sensation dependent on idea, but does not avail to restore a lost organ or an amputated limb.

Professor Charcot believes also that the faith-cure may cause ulcers and tumours to disappear, if such lesions be of the same nature as the paralysis cured by the same means. In all this there is no miracle. The diseases are all of hysterical origin, according to this eminent authority, and being purely dynamic, and not organic, the mind has power to influence and cure them. The mind of the invalid becomes possessed of the overpowering idea that a cure is to be effected, and it is so.

M. Littré has explained for us how this happens.¹ The mind, which is most eminently receptive of suggestion, will be the most likely to be influential in curing the body in which it is enshrined, by the powerful force of auto-suggestion.²

In expressing this opinion, no question need arise of the efficacy of prayer or of the intervention of the Divine power. The aim of the physician is to understand the medical side of the subject, and science is daily becoming more capable of offering an explanation of such phenomena from a purely medical point of view. A curious instance of faith-cure was recently given in a Catholic magazine.

The *Month* for June, 1892, published an account, by the late Earl of Denbigh, of a cure worked by a member of a family named Cancelli on Lady Denbigh in 1850. She was suffering severely from rheumatism, and the Pope (Pius IX.) mentioned to the Earl that near Foligno there was a family of peasants who were credited with a miraculous power of curing rheumatic disorders. Lord Denbigh succeeded in getting one of the family, an old man, to come, and learned from him the legend of the cure. The belief was that in the reign of Nero, the Apostles Peter and Paul took refuge in the hut of an old couple named Cancelli, near Foligno, and as a proof of gratitude, gave to the male descendants of the family living near the spot the power of curing rheumatic disorders to the end of time. Lord Denbigh described how the old man made a solemn invocation, using the sign of the cross, and, in fact, Lady Denbigh did recover at once. In a few days the pains returned, but she made an act of resignation, and they then left her, and never returned with any acuteness.

¹ See p. 320 of this work.

² Charcot, *The Faith Cure*.

EXPERIMENTAL PHYSIOLOGY.

The question of vivisection, or experimental physiology, pathology, and pharmacology, has become a burning one in England and America of recent years. In a history of medicine so prominent a question cannot be entirely ignored, although it would be out of place to discuss it here at length. It has been claimed that almost all our real knowledge of the healing art, and the most important steps of medical progress, have been gained by experiments upon living animals. On the other hand, it has been maintained by practical physicians and surgeons that the method in question is not less misleading than cruel; that "the only correct path is that of thoughtful experience."¹ On behalf of the advocates of the experimental method, PROFESSOR MICHAEL FOSTER shall state the case; that of the other side shall be given in the words of SIR ANDREW CLARK, "the prince of physicians, and one of the noblest of men," under whom it was my happiness and privilege to study medicine in the wards of the London Hospital.

PROFESSOR MICHAEL FOSTER says: "It would not be a hard task to give chapter and verse for the assertion that the experimental method has, especially in these later times, supplied the chief means of progress in physiology; but it would be a long task, and we may content ourselves with calling attention to what is in many respects a typical case. We referred a short time back to the phenomena of 'inhibition.' It is not too much to say that the discovery of the inhibitory function of certain nerves marks one of the most important steps in the progress of physiology during the past half-century. The mere attainment of the fact that the stimulation of a nerve might stop action instead of inducing action constituted in itself almost a revolution; and the value of that fact in helping us on the one hand to unravel the tangled puzzles of physiological action and reaction, and on the other hand to push our inquiries into the still more difficult problems of molecular changes, has proved immense. One cannot at the present time take up a physiological memoir covering any large extent of ground without finding some use made of inhibitory processes for the purpose of explaining physiological phenomena. Now, however skilfully we may read older statements between the lines, no scientific—that is, no exact—knowledge of inhibition was possessed by any physiologist, until Weber, by a direct experiment on a living animal, discovered the inhibitory influence of the pneumogastric nerve over the beating of the heart. It was, of course, previously known that under certain circumstances the beating of the heart might be stopped; but all ideas as to how the stoppage

¹ Baas, *Hist. Med.*, p. 1100.

was, or might be, brought about, were vague and uncertain before Weber made his experiment. That experiment gave the clue to an exact knowledge, and it is difficult, if not impossible, to see how the clue could have been gained otherwise than by experiment; other experiments have enabled us to follow up the clue, so that it may with justice be said that all that part of the recent progress of physiology which is due to the introduction of a knowledge of inhibitory processes is the direct result of the experimental method. But the story of our knowledge of inhibition is only one of the innumerable instances of the value of this method. In almost every department of physiology, an experiment, or a series of experiments, has proved a turning-point at which vague, nebulous fancies were exchanged for clear, decided knowledge, or a starting-point for the introduction of wholly new and startling ideas.

"And we may venture to repeat, that not only must the experimental method be continued, but the progress of physiology will chiefly depend on the increased application of that method. The more involved and abstruse the problems become, the more necessary does it also become that the inquirer should be able to choose his own conditions for the observations he desires to make. Happily, the experimental method itself brings with it in the course of its own development the power of removing the only valid objection to physiological experiments, viz., that in certain cases they involve pain and suffering. For in nearly all experiments pain and suffering are disturbing elements. These disturbing elements the present imperfect methods are often unable to overcome; but their removal will become a more and more pressing necessity in the interests of the experiments themselves, as the science becomes more exact and exacting, and will also become a more and more easy task as the progress of the science makes the investigator more and more master of the organism. In the physiology of the future, pain and suffering will be admissible in an experiment only when pain and suffering are themselves the object of inquiry. And such an inquiry will of necessity take a subjective rather than an objective form." ¹

Let the President of the Royal College of Physicians give his views of the utility of vivisection from the point of view of a practical physician:—

SIR ANDREW CLARK before the "Clinical Society of London" (*British Medical Journal*, Feb. 3, 1883) said: "For whatever purpose they may be employed; however carefully they may be designed and executed; however successful may be the precautions taken to exclude

¹ *Ency. Brit.*, art. "Physiology," vol. xix. p. 23.

error, experiments have their subtle difficulties and dangers which are perilous to truth, and cannot be wholly averted. By the prestige of precision, which often undeservedly they profess, undue weight is attached to their results ; and by the assumption that in like conditions the results would be the same in man as in the lower animals, flagrant errors are committed, and currency is given to false or inadequate generalisations. The experimenter interprets the results of his experiments by the light of their structural results ; he forgets or he ignores the life-history of the processes by which they have been evolved, and he takes no account of the fact, beyond controversy, that different clinical states find occasionally the same structural expression. In such circumstances doubt is inevitable, and it is only to clinical medicine that any just appeal for its solution can be made. To her, at last, all such experiments must be brought for trial ; she must be their examiner, critic, interpreter, user, and judge. And no results of experiments can be made of any avail to medicine, or be used with safety in her service, until they have been filtered through the checks and counter-checks of clinical experience, and have responded to the tests and counter-tests of clinical trial. Had these principles exerted their just influence in the recent debates concerning questions of this kind, we should not have had a seton in the neck of a man taken as the parallel of a seton in the neck of a guinea-pig ; we should not have had the artificial tuberculosis of the rodent pronounced to be identical with the natural tuberculosis of the child ; we should not have had grey tubercles and caseous pneumonias pronounced on the grounds of mere likeness of structure to be of one and the same nature ; and we should have been spared the sight of science, drunken with success and drivelling with prophecies, soliciting the public on the common highway."

APPENDIX.

ON SOME OF THE MORE IMPORTANT MINERALS USED IN MEDICINE.

(Compiled chiefly from Royle's *Materia Medica*.)

CARBONATE OF SODA is the *neter* of the Hebrews. It was known to the early Hindus, and is by them called *Sajji noon* (i.e. Sajji or Soda Salt); it is the *Sagimen vitri* of Geber. The Natron lakes of Egypt were known to the ancients, and it was early employed in glass-making, etc. (Royle). On the shores of the Indian Ocean, the Red Sea, and the Mediterranean, plants of the order *Chenopodeæ* are burned to form the ash called *Barilla*, and from this ash soda is obtained. Carbonate of soda was also formerly prepared on the coasts of Scotland, Ireland, Wales, and Normandy, by burning algæ or sea-weeds, and the ash so obtained was called *kelp*. There is no doubt that the process is extremely ancient, and the discovery of the properties of these ashes accidental.

CHLORIDE OF SODIUM, or common salt, is so universally distributed that it must have been known and used in food from the earliest ages.

BORAX is thought to have been the *Chrysocolia* of Pliny. It is the *Sohaga* of the Hindus (Sanskrit, *Tincana*), and is called *Booruk* by the Arabs. It is abundant on the shores of some of the lakes in Thibet, and was brought into India across the Himalayas (Royle).

SULPHATE OF SODA, or Glauber's Salt, is found on the soil in India and other countries, and exists in the ashes of many plants, in mineral springs, and in sea-water.

LIME was known to the Egyptians and Hindus.

MAGNESIA seems to have been known to the alchemists. Its name occurs in Geber and other writers of the period. The CARBONATE OF MAGNESIA was probably first used as a medicine by the Count de Palma at Rome. Hoffmann introduced it into the list of *Materia Medica*.

EPSOM SALTS (SULPHATE OF MAGNESIA) was first discovered by Dr. Grew in 1675 in a spring at Epsom. It is found in many countries.

ALUM is mentioned in *Pliny*, xxxv. chap. 15, and probably is referred to by *Dioscorides* (v. chap. 122). *Shib* was the generic term of alum of various kinds in Arab writings. Egyptians and Hindus must have known of its properties from the earliest ages of their civilization. It was introduced into Europe from Syria by the Genoese.

GREEN VITRIOL or SULPHATE OF IRON was known to the ancients. It is mentioned, says Dr. Royle, in the *Amera Cosha* of the Hindus (*Hind. Med.*, p. 44), and it is used by them as by the Romans in the time of Pliny in making ink.

ZINC seems to have been first made known as a metal in Europe by Paracelsus. The Hindus have imported it from China from remote times. The Oxide of Zinc was anciently called *tutty*, probably from the Tamil *Tutanagum*. In the East, says Royle, SULPHATE OF ZINC is called *suffed tutia*, or white *tutia*, the Sulphates of Iron and Copper being called *green* and *blue tutia* (*Hindu Med.*, p. 100).

COPPER was one of the metals most anciently known. It was employed in medicine by the Hindus and Arabs in the form of the Sulphate or Blue-stone. VERDIGRIS, the DIACETATE OF COPPER, must have been known wherever copper vessels were used. It was employed by the Greeks as a medicine, by the Arabs, and probably also by the Egyptians.

LEAD was equally well known of old; the carbonate of the metal was one of the most anciently known of the metallic salts. The Middle Ages introduced the acetate of lead commonly known as SUGAR OF LEAD. EXTRACT OF LEAD, or EXTRACT OF SATURN, or *Goulard's Extract*, have been known since the time of B. Valentine.

BISMUTH was first mentioned by Agricola in 1520.

SULPHUR was employed in medicine by the Greeks, Hindus, and Arabs. Geber knew of its solubility in an alkaline solution, and Albertus Magnus taught the method of procuring Sulphuret of Potassium by fusion.

PHOSPHORUS was discovered in 1669, when it was found in the Phosphate of Soda and Ammonia of Urine by Brandt, an alchemist of Hamburg. Knuckel in Germany and Boyle in England had also the credit of discovering it (Royle, *Mat. Med.*).

NITRIC ACID was known to Geber, and probably also to the Hindus (Royle, *Mat. Med.*).

IODINE was obtained by M. Courtois in 1812 in the residual liquor of the process for obtaining soda from sea-weed.

IODIDE OF POTASSIUM was first employed in medicine by Coindet.

BROMINE was discovered in 1826 by M. Balard, in *bittern*, the uncrystallisable residue of sea-water. Bromide of Potassium was first introduced into the London Pharmacopœia in 1836.

SAL AMMONIAC was known to Geber. Avicenna and Serapion mention it by the name *Noshadur*. Persian writers give *Armeena* as its Greek synonym. The Sanskrit name is *Nuosadur*. In Egypt it is made from camel's dung. It must have been known to the Romans, as Pliny says that one of the kinds of *Nitrum* gives out a strong smell when mixed with quicklime (Royle, *Mat. Med.*).

CARBONATE OF POTASH is obtained by the burning of vegetables. It must therefore have been known to primitive nations. "Dioscorides describes it by the name *τεφρα κληματανης*, or *Cinis sarmentorum*, ashes of vine twigs ('cineris lixivium,' Pliny, xxxviii. chap. 51). The Arabs are usually supposed to have been the first to make known this alkali (*al-kali*); but the Hindus, in works from which the Arabs copied, made use of the ashes of plants" (Royle, *Mat. Med.*).

TIN was the *Bedel* of Moses. It was used by the Egyptians, who probably procured it from India. The Greeks and Romans obtained it from the Phœnicians.

ANTIMONY was probably discovered by the Alchemists. The sulphuret of the metal, however, is the *στιμμι* and stibium of the ancients. In Asia it has been used from time immemorial for painting the eyebrows and eyelids. Several of the Sulphurets of Antimony have long been used in medicine. The Tartarate (TARTAR EMETIC) is supposed to have been discovered by Mynsicht (Thesaurus, etc., Hamburg, 1631).

MERCURY or QUICKSILVER was known to the ancients. It was probably first prescribed internally by the Hindus. The Romans and Arabs used it externally. Pliny says that mercury is poisonous, "unless, indeed, it is to be administered in the form of an unction on the belly, when it will stay bloody fluxes." The Arabs appear to have re-introduced it into the European practice (Royle). The red oxide was known to Geber. CALOMEL is the subchloride of mercury. It occurs native in Carniola and in Spain. The Hindus from very early times prepared it artificially and prescribed it internally. It was introduced into European practice in 1608. BICHLORIDE OF MERCURY, or CORROSIVE SUBLIMATE, is the *ruskapoor* of the Hindus, to whom, says Royle, it has long been known. It was known also by the Chinese, and was

prepared by Geber in the eighth century. The AMMONIO-CHLORIDE of mercury, or WHITE PRECIPITATE, was discovered by Raymond Lully in the thirteenth century. CINNABAR or VERMILION, the RED SULPHURET OF MERCURY, was known to the Greeks, and was one of the pigments employed by the Egyptians. It has been used by the Chinese and Hindus in medicine from very early times. The ointment of mercury killed with oil or fat was used by the Saracens for killing lice, just as it is used at the present time for the same purpose.

Preparations of ARSENIC have long been used in medicine. Dioscorides applies the name Arsenikon (*αρσενικον*) to the yellow Sulphuret of Arsenic.

The Arabs call it *zurneekh*, which is supposed by Sprengel to be a corruption of Arsenikon. They were familiar with the white oxide which they called *sum-al-far*, *mouse poison* or *rat's-bane*. The Hindus are well acquainted with the form of arsenic known as orpiment, which they call *hural*; realgar, which is their *mansil*; and white arsenic, which they name *sanchya*. Royle thinks it was first prescribed internally by the Hindus, who used it for leprosy and intermittent fevers. It is a remedy of great value in many kinds of skin diseases, and is of great use in agues and in all periodic disorders, for which it is only inferior to quinine.

SILVER is supposed to have first been employed in medicine by the Arabs. GOLD was employed by the Greeks and Arabs in medicine, but it is not known which were the first to so use it. The Hindus used it long before the alchemists investigated its properties.

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